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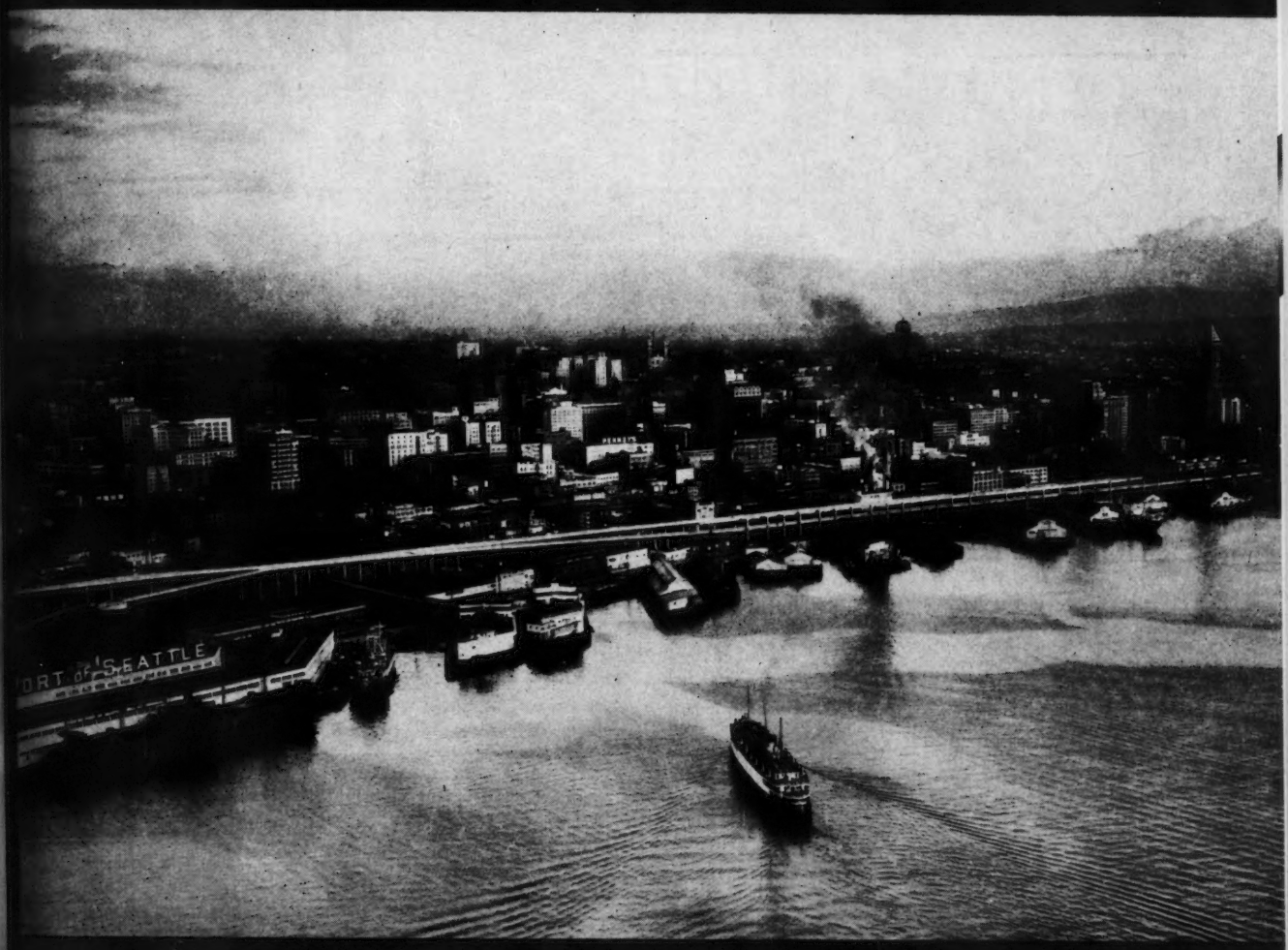

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Vol. 28 DECEMBER, 1957 Number 3

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COVER: Alaskan Way, a double-deck viaduct, is a prominent feature of Seattle's waterfront.
Photo courtesy Seattle Times

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Frankly Speaking . . .

OVER THE YEARS there have been a number of attempts to unite the engineering profession in some sort of central organization. The American Engineering Council was one of the early attempts. There are three groups prominently mentioned today whenever unity in the profession is discussed. These are EJC (Engineers Joint Council), ECPD (Engineers' Council for Professional Development), and NSPE (National Society of Professional Engineers). Various attempts to bring these three together have failed.

Now another plan has been proposed, and it is important enough that all engineers should know of it and form some opinion regarding it. The proposal has been advanced by Mr. M. S. Coover, former president of the American Institute of Electrical Engineers. Briefly, his plan suggests that:

> EJC represent the engineering profession on technical matters,
>
> ECPD provide the medium for guidance on everything relating to engineering education, including their present accrediting function, and
>
> NSPE undertake general responsibility for professional and economic problems of engineers.

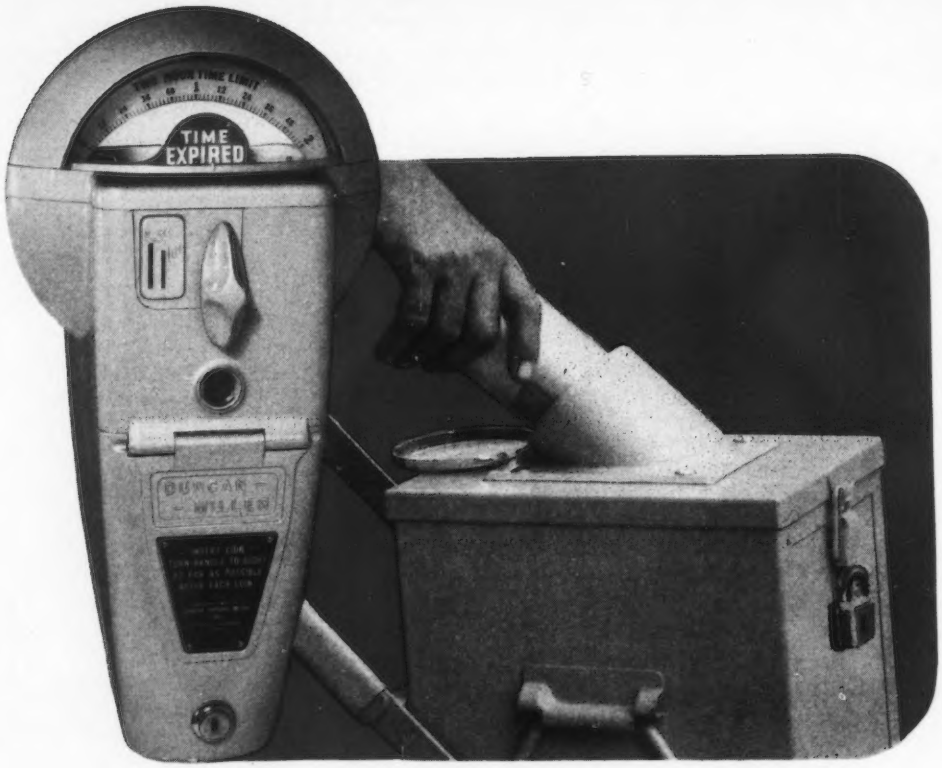
The proposal has been discussed to some extent by most engineering societies, although not by all. Some of those which have discussed it are against the plan, others are for it, and still others have it under study.

A key question concerns the NSPE. Under the plan, NSPE would have to open its membership to men who are not registered as professional engineers. In the opinion of some people this is not realistic in view of the fact that registration is a fundamental concept of NSPE. It is important to note, however, that a committee of NSPE has just recommended and the Board of Directors has approved re-examination of NSPE admission requirements and re-consideration of the possibility of joining EJC. Also recommended was the preparation of a booklet which would set forth the issues so that NSPE members could study the matter.

The Institute of Traffic Engineers has taken no position in the matter. After looking into the possibility of joining EJC last year, the Board of Direction voted to give up the idea. Principal factors were the cost, lack of definite benefits to be gained, and general uncertainty about the future of EJC. This decision is of course open to review and change.

The entire subject of engineering unity and methods of achieving it is one which needs the thoughtful attention of all engineers. Comments in the form of letters will be appreciated, and will be published within the limitations of space.

DAVID M. BALDWIN
Executive Secretary
Institute of Traffic Engineers



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Operational Characteristics of High Volume On-Ramps

By Eugene J. Lessieu
(Jun. Mem., ITE)
Highway Project Planner
The Port of New York Authority

A digest of a thesis submitted to the Bureau of Highway Traffic, Yale University, May 1957. This paper won the 1957 Past Presidents' Award of the Institute of Traffic Engineers and was presented at the Annual Meeting September 23, 1957 in Detroit, Mich.

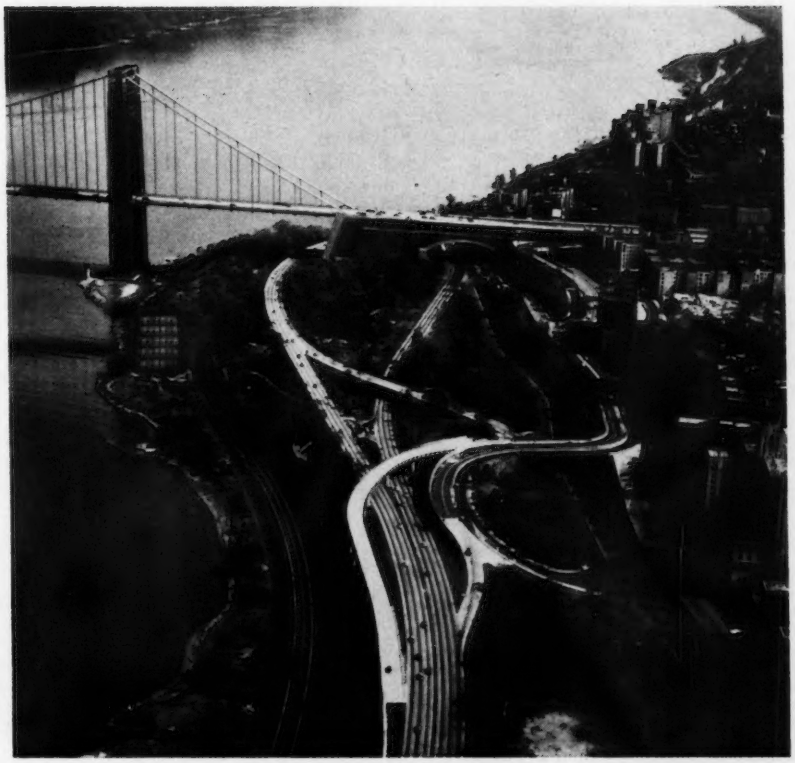


Figure 1
Henry Hudson Parkway looking north at George Washington Bridge.

WITH THE INCREASING USE of the direct connection type interchange on our new highways, the high volume ramp is becoming more important than ever before. Ramps are usually designed for one-lane operation because of their steep grades and sharp curvature. However, in cases where ramp volumes are expected to be high, such as in a direct connection interchange, grades and curves may be flattened to encourage two-lane flow. Under these conditions, the ramp terminal area i.e., the access to the thru route, becomes the capacity controlling element. How then should the ramp terminal area be designed and operated to get the most out of a two-lane ramp? Should the ramp terminal be left as two lanes or might it be just as well to squeeze it down to one lane if no additional lane is added to the thru route?

In ramp terminal design and operation, traffic engineers have suggested avoiding compounded merging areas. In the text "Traffic Engineering" by Matson, Smith and Hurd, the authors state, "The volumes of traffic accommodated by compounded merging... areas... are little greater than those of elemental merging areas, and they cause greater hazard and delay."*

Compounded and elemental merging areas are illustrated in Figure 2 as they apply to this problem. Note that in a compounded merging area there are *two* more lanes before the merge than after, whereas in the elemental merging area, there is only *one* more lane before the merge than after.

The purpose of this study was to investigate the operations at a high volume ramp terminal, to determine whether as much volume could be accommodated by an elemental merging area as by a compounded merging area, under similar operating conditions.

The study was conducted at one high volume ramp terminal under both one-lane and two-lane ramp access conditions. The specific site was at the connection of a ramp leading from the George Washington Bridge to the Henry Hudson Parkway southbound in New York City. The location simulates the type of traffic movement that might occur at a direct connection interchange since an off-ramp takes about 1000 v.p.h off of the thru route, 2000 feet in advance of the on-ramp. An additional observation was made at another location where a three-lane thru route was narrowed down to two lanes to allow traffic from a one-lane ramp to enter. Here again, a considerable amount of traffic was removed from the thru route by an inside loop just prior to the on-ramp. In both cases, the thru route was a parkway limited to passenger vehicles only.

Method

Three methods were used in collecting data. The multiple maneuvers observed during preliminary observations

*Matson, Smith and Hurd, **Traffic Engineering**, New York: McGraw-Hill Book Co., Inc. 1955. p. 527.

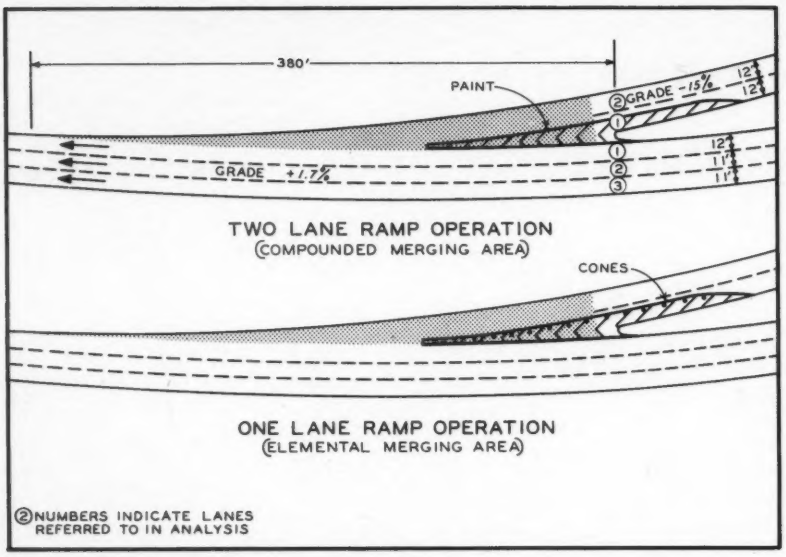


Figure 2

of the site indicated that the use of a camera would be the only suitable method of recording all that took place. However, analysis of the film recorded data was time-consuming and judged impractical since too many maneuvers took place at the same time and under varying influences to be recorded as normal maneuvers. A manual count and a 20-pen recorder count were used in subsequent observations and proved successful. Speed observation in the latter cases were made with a stop watch.

Comparison of the various lane arrangements were based on 5 minute volumes, speeds and lane changes. Five minute volumes were used since this appeared a long enough period of time on which to base a rate of flow and still get as many samples as possible during a limited number of observations. Speeds thru the merging area were used to group the various 5-minute volumes into similar operating conditions, and lane change data were used to indicate the amount of maneuvering that took place in the merging area under the various lane arrangements.

For the purpose of identification, the 5-minute volumes are translated to hourly rates of flow by multiplying by 12. Since 5-minute volumes are not commonly used by the traffic engineer or designer, the use of hourly rates makes it easier to associate the flow rates discussed here with those encountered in design and capacity manuals. It is well, however, not to lose sight of the fact that the hourly rates used in this study are based on 5-minute volumes.

Two-Lane Ramp Access

Observations made during the time when the ramp was operating with two-lane access, ie., the compounded merging condition, showed a maximum rate of flow from the ramp of from 1700 to 1900 v.p.h. during free flow conditions. There was one 5-minute period where a volume of 189 vehicles merged from the ramp (this is a rate of 2270 v.p.h.). However, this condition was forced since it occurred when the ramp was changed from a one-lane access to a two-lane access, and the back-up on the ramp emerged at a very rapid rate. Speeds on the parkway were slightly reduced and volume on the parkway was lower than the average, especially in lane 1 which was only running at the rate of 260 v.p.h. This rate of ramp flow did not last very long, however, since congestion in the merging area occurred within a short time after this. However, the ramp volume of 2270 must be mentioned, since it was recorded and shows the potentialities of this type of ramp access.

During periods when the ramp was operating with two-lane access, the parkway was operating at a rate of slightly over 3000 v.p.h. In the highest 5-minute period of free flow on the parkway, it operated at 3150 v.p.h. with 1500 v.p.h. on the ramp or a total rate of 4650 v.p.h. The 5-minute period with the highest total volume was 5250 v.p.h. with the parkway accounting for 2980 and the ramp 2270. This was also free flow.

During the free flow conditions observed, speed ranged from about 20 to 27 m.p.h. for the ramp traffic and about 32 to 40 m.p.h. for the parkway traffic. The slower speeds apply to the higher volume conditions and the faster speeds to the lower volume conditions. It should be noted here that the speed limit on the parkway was posted for 35 m.p.h.

The lane change data for the two-lane ramp access condition pointed up some interesting information. Lane change data taken from the film is extremely accurate since each vehicle was traced through the merging area individually. Lane changes from the other data were estimated by counting each lane at both the beginning and at the end of the merging area. From the film data, it was revealed that the majority of the ramp traffic left the merging area in lane 1 of the parkway. Another point is that the majority of ramp traffic used lane 2 of the ramp. Lane 1 of the ramp was painted out to encourage this movement, but was violated in periods of heavy traffic. However, the data show that even most of the traffic that used lane 1 on the ramp never got beyond lane 1 of the parkway. This, to some degree, defeated the advantage of an additional lane on the ramp.

The lane distribution on the parkway showed a small per cent of traffic in lane 1 before the merging area. The lane change data showed that even some of this traffic moved to lane 2 while in the merging area.

In almost all cases, lanes 2 and 3 of the parkway after the merging area carried almost as much traffic as all three lanes of the parkway before the merging area.

One-Lane Ramp Access

In order to observe the operation in an elemental merging area, lane 1 of the ramp was coned off. This left only one lane of access from the ramp. Maximum rates of flow recorded here were about the same as during two-lane access, i.e. 1700 to 1900 v.p.h. from the ramp and about 3000 v.p.h. from the parkway. The highest 5-minute period of parkway flow was 3250 v.p.h. and the highest ramp flow was 1920 v.p.h. They both occurred at the same time so that the total rate of flow of the parkway going away was 5170 v.p.h. This was the highest total flow observed for the elemental merging area. However, it was recorded twice

and on two separate days both under free flow conditions.

Speeds through the merging area were about the same as with two-lane ramp access. Back-up on the ramp, however, was more severe in some cases of one-lane ramp access.

In the one-lane ramp access condition, volume in lane 1 of the parkway before the merging area was only about 15 per cent of the total volume. No specific lane changes could be recorded since the operation was not filmed. However, analysis of the lane volumes before and after the merging area showed the same type of lane distribution shift that was noted in the observation where lane changes were specifically counted. The volumes in lane 2 and 3 of the parkway after the merging area were just slightly less than the total parkway volumes before the merging area. This is the same characteristic that appeared under the two-lane ramp condition.

The volumes accommodated in lane 1 of the parkway beyond the merge were about the same with one lane as with the two-lane ramp access. Both ramp arrangements resulted in a maximum rate of flow of about 2000 v.p.h. in lane 1 of the parkway leaving the merging area.

Comparison with Grand Central Parkway

All the data collected at the Henry Hudson Parkway site led to the premise that it would be logical to investigate the operation with *lane 1* of the parkway closed off in advance of the ramp. This arrangement would result in an elemental merging area since it would have four lanes feeding three lanes. However, it was impossible to make the necessary arrangements for such an experiment, and it was necessary to move to another site where such a practice was in everyday use. This site was at the Northern Boulevard interchange of the Grand Central Parkway, also in New York City. The site consisted of a one-lane ramp merging into a three-lane parkway. The ramp is normally controlled by a stop sign. However, during the evening peak hours, lane 1 of the parkway is coned off and the stop sign covered so that the ramp traffic can move freely onto the parkway. The operation at the ramp terminal, then, required no merging at all since it consisted of two lanes from the parkway and one lane

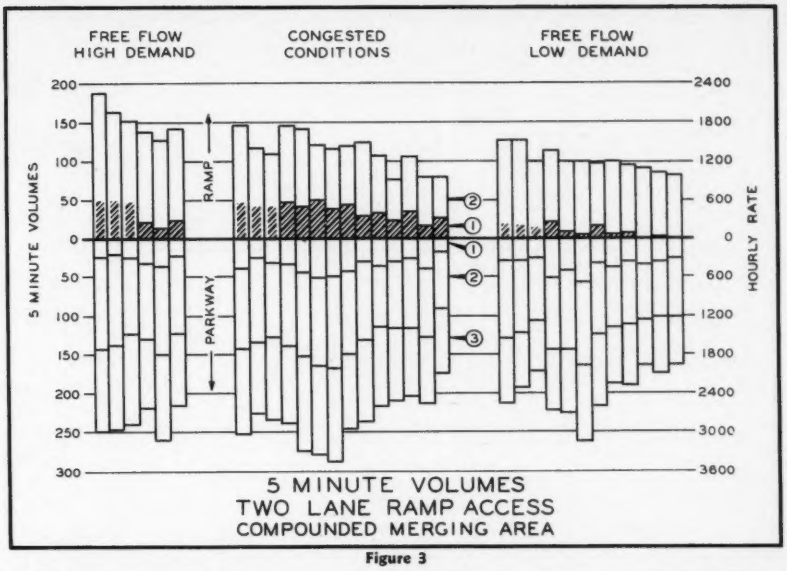
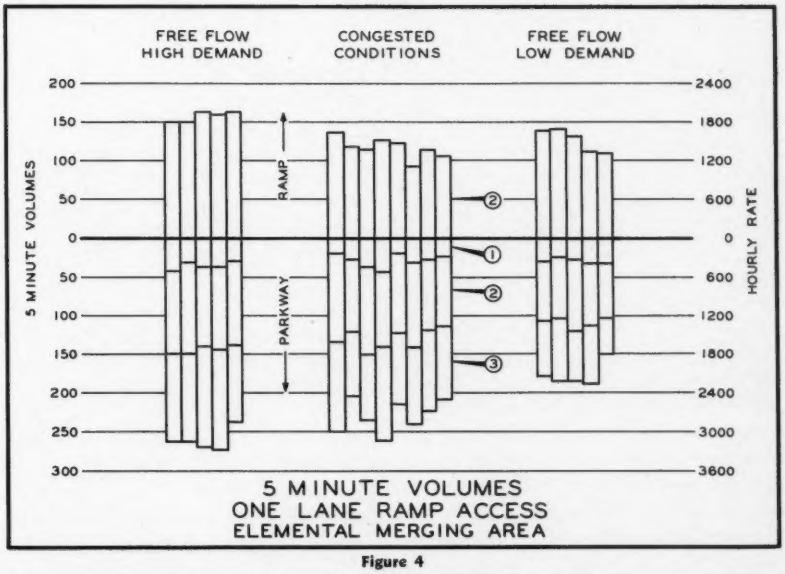


Figure 3



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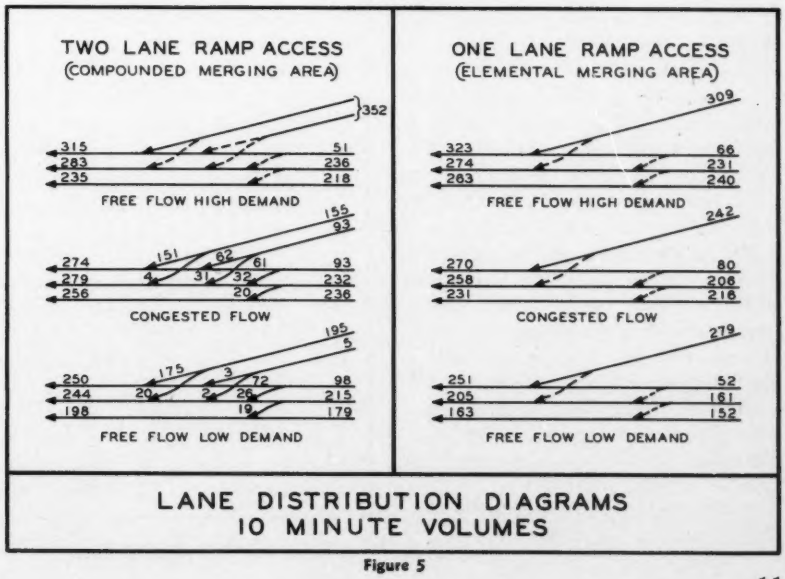


Figure 5

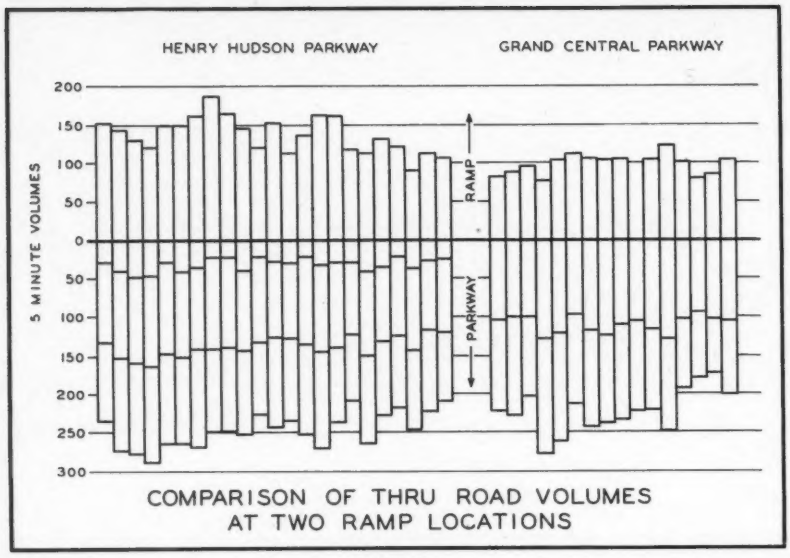


Figure 6

from the ramp moving into three lanes ahead.

Volumes accommodated by the two lanes of the parkway were about the same as the volume carried in three lanes of the Henry Hudson Parkway. The maximum 5 minutes was at a rate of flow of 3360 v.p.h. and there were two other 5-minute periods where flow rate was greater than 3000 v.p.h. The full hour had a volume of 2837 vehicles. The ramp, which in this case had a separate lane for free access to the parkway, was only running at about 1200 v.p.h. with the maximum 5-minute rate being 1450 v.p.h. There was no apparent reduction in speed of the two thru lanes of traffic.

Comparison with California Study

Since the data taken at the Henry Hudson Parkway site showed that there was little difference in the volumes accommodated by either one or two-lane ramp access, it appeared necessary to investigate the data further to see if there was any other element governing the capacity of the ramp.

A lead for further investigation was taken from a recent California study. In the report on the study, the authors stated that "the volume at which merging breaks down always seems to be when 170 vehicles try to squeeze into one lane at the end of the merging area in 5 minutes. This is a headway of 1.8 seconds and represents the possible capacity of the going away lane."* The data collected by California at one high volume ramp location was obtained and it showed that the sum of the *ramp traffic* plus the traffic in *lane 1 of the thru route* equalled 170 vehicles per 5 minutes in the maximum cases. The volumes recorded for the same two streams of traffic at the Henry Hudson Parkway site in many cases were greater than 170 vehicles per 5 minutes. However, with all the lane changes considered, the maximum volume accommodated by lane 1 of the Henry Hudson Parkway going away was 170 vehicles per 5 minutes. This occurred under both the one-lane ramp access and the two-lane ramp access conditions. It was this fact as much as any other that limited the capacity of the ramp.

It cannot be stated from the data collected that the "merging broke down" at these volumes because merging in these particular cases was not what would be considered smooth merging. This can be illustrated by recalling the statement made above that ramp volumes plus lane 1 volumes were greater than 170 vehicles per 5 minutes, and that the lane change analysis indicated that some of the ramp traffic as well as some of the traffic from lane 1 of the parkway moved into lane 2 of the parkway within the merging area.

Summary and Conclusion

To sum up the results of the study, it was found that in the case of a high volume on-ramp leading onto a high volume thru route, one-lane ramp access accommodated almost as much traffic as two-lane ramp access. Under both one-lane and two-lane access conditions, the ramp operated at about 1700 to 1900 v.p.h. and the thru route at slightly over 3000 v.p.h. Further, in a case where ramp volume was high, observations in the study showed that squeezing a three-lane thru route down to two lanes prior to the ramp merge, operated efficiently, with no reduction in the speed of the thru route traffic. The two squeezed lanes operated at about 3000 v.p.h. In observations where the thru route was not squeezed down, the lane counts showed that it might have been possible to do so, since the volumes accommodated in two lanes beyond the merging area were almost as great as the total vol-

(Continued on page 46)

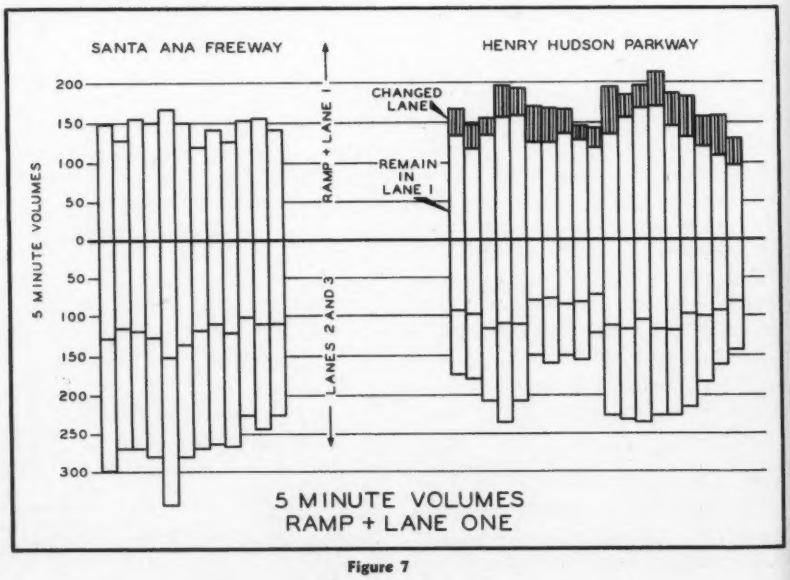


Figure 7

*Moskowitz, Karl. "Research on Operating Characteristics of Freeways." 1956 Proceedings. Wash., D.C., ITE 1956, p. 98.

Atlanta Solves its Downtown Parking Problem

By Karl A. Bevins
(Mem., ITE)
City Traffic Engineer, and
Earl R. Slider, Jr.
(Jun. Mem., ITE)
Assistant Traffic Engineer
Atlanta, Georgia

ATLANTA HAS EXPERIENCED, as have many other cities, a very rapid post-war growth. This growth has been evidenced not only by the outward expansion of residential and commercial districts but also by a greater concentration of capital within the central business district. Office buildings, department stores, and other multi-story commercial structures now stand where there were formerly single story buildings, residences or vacant lots. Growth has also been manifested by an increase in vehicle registrations. In 1945 the two counties in which Atlanta is located had combined vehicle registrations of 110,818. By 1955 this total had reached 276,348, an increase of 151 per cent.

The central business district is invariably an outstanding traffic generator demanding a heavy concentration of parking. Therefore, a natural result of Atlanta's rapid growth was a large increase in the number of people who wished to drive into and park in the central business district.

Lack of parking facilities became a matter of serious concern to those interested in seeing the downtown area continue its prosperous and proper role. In March 1953, the State Legislature created the Atlanta Parking Commission for the purpose of studying the parking problem and providing pertinent data concerning the location and extent of needed off-street parking facilities. The Commission was directed to publish its findings and make specific recommendations regarding the parking problem.

The commission made a very detailed study and analysis of parking supply and demand in an area of six tenths of a square mile. This area covered the downtown busienss area in which the parking problem was most critical. Public hearings were held in order that the Commission might receive the benefit of the many and somewhat diverse opinions of all interested individuals and organizations.

The Bird Cage Garage at Edgewood Avenue and Exchange Place was built in 1956 and is operated by the Roy Livingston Company. This garage has a capacity of 531 cars, of which, 217 are on sloping floors and are for self-parking customers.

After carefully analyzing the results of its study and considering the parking problem in its proper relation to traffic control and mass transit operation, the Commission published its findings and recommendations in October 1953.

In stating its conclusions and recommendations to the State Legislature, the Commission discussed at length the question of private enterprise versus municipal operation of parking facilities. The final conclusion of the Commission stated:

"We regard private enterprise as the most desirable and efficient medium for conducting the parking

TABLE 1

NUMBER OF PARKING SPACES IN THE DOWNTOWN AREA RECORDED IN SPACE INVENTORIES

Date of Inventory	*Months Between Inventories*	*Structure Spaces*	*Lot Spaces*	*Total Spaces*
May 1945	X	Unknown	Unknown	11,195
Feb. 1948	33	3,245	9,381	12,636
May 1951	39	3,594	11,679	15,273
May 1953	24	4,851	11,609	16,460
Jan. 1955	20	5,685	11,640	17,325
Dec. 1956	23	8,883	12,655	21,538

The Rich's Garage at 1 Forsyth Street S. W., was built in 1954 and is operated by Central Parking Incorporated. This garage has a capacity of 275 cars and uses a one-way tandem staggered floor ramp.

business; our finding of facts with respect to present supply and demand and our projections into the future lead us to believe that most of the shortages now and in the future can be taken care of if private enterprise makes a determined effort to do so; but, if private enterprise cannot do the job either because future demand greatly exceeds our estimates or because private operators do not respond fully to their opportunity, then the community may be forced to what we consider the undesirable method of direct municipal action."

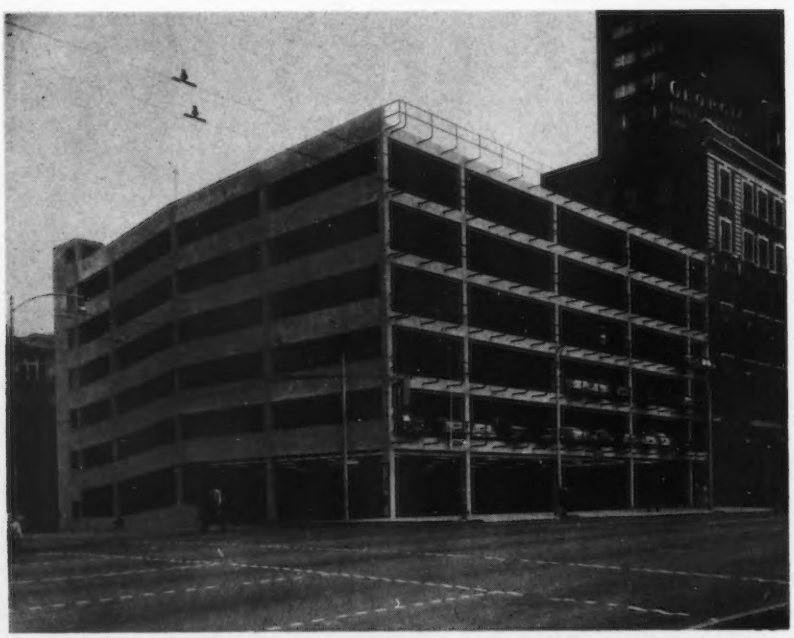
The Commission also recommended legislation which would authorize the city of Atlanta to restrict, limit or otherwise regulate the use of buildings and lots for public parking.

As a result of these recommendations, the State Legislature did not authorize municipal ownership for operation of public parking facilities. However, the city governing authorities were authorized to regulate parking facilities as recommended and a new Traffic and Transportation Commission was created to aid in this function. This new body is composed of the Mayor and one Alderman as ex-officio members, seven citizens of the city and the City Traffic Engineer as secretary. One of its prime duties is to investigate each proposal for a new or expanded off-street parking facility, giving proper weight to such factors as street capacity, ingress and egress, reservoir space and effect on future traffic improvement plans. The findings of the commission are submitted to the Board of Aldermen with a recommendation for approval or denial of the permit. Since the adoption of this program there has been a marked increase in the off-street parking spaces.

Prior to 1953 parking operators were reluctant to provide new facilities sensing that municipal ownership or operation might become a reality in Atlanta. The recommendations of the 1953 Parking Commission challenged the parking operators by indicating that municipal ownership would be used only if private enterprise failed to meet the parking needs.

Private operators have accepted the challenge and have made commendable progress. In May 1953, when the Parking Commission study was conducted, there were 16,460 off-street spaces available. By December 1956 this number had increased by 5,078 (31 per cent) to 21,538. Of the 5,078 spaces added, 4,032 are in modern garage structures. This means that garage spaces which are more desirable because of their highly permanent nature increased 83 per cent in three and one-half years and now represent 41 per cent of the total spaces available as compared to 29 per cent in May 1953. (See Table I.)

This report and its accompanying charts are based on a parking inventory conducted in December of 1956; however, it should be stated here that new parking spaces are still being added. This is evidenced by records which show 946 more spaces are under construction or have been added since the beginning of 1957.



The 79 Marietta Garage located on the northeast corner of Marietta Street and Cone Street was built in 1957 and is operated by Kinney System, Incorporated. This garage has a capacity of 300 cars with an inbound reservoir for 20 cars and employs a semi-circular ramp system.

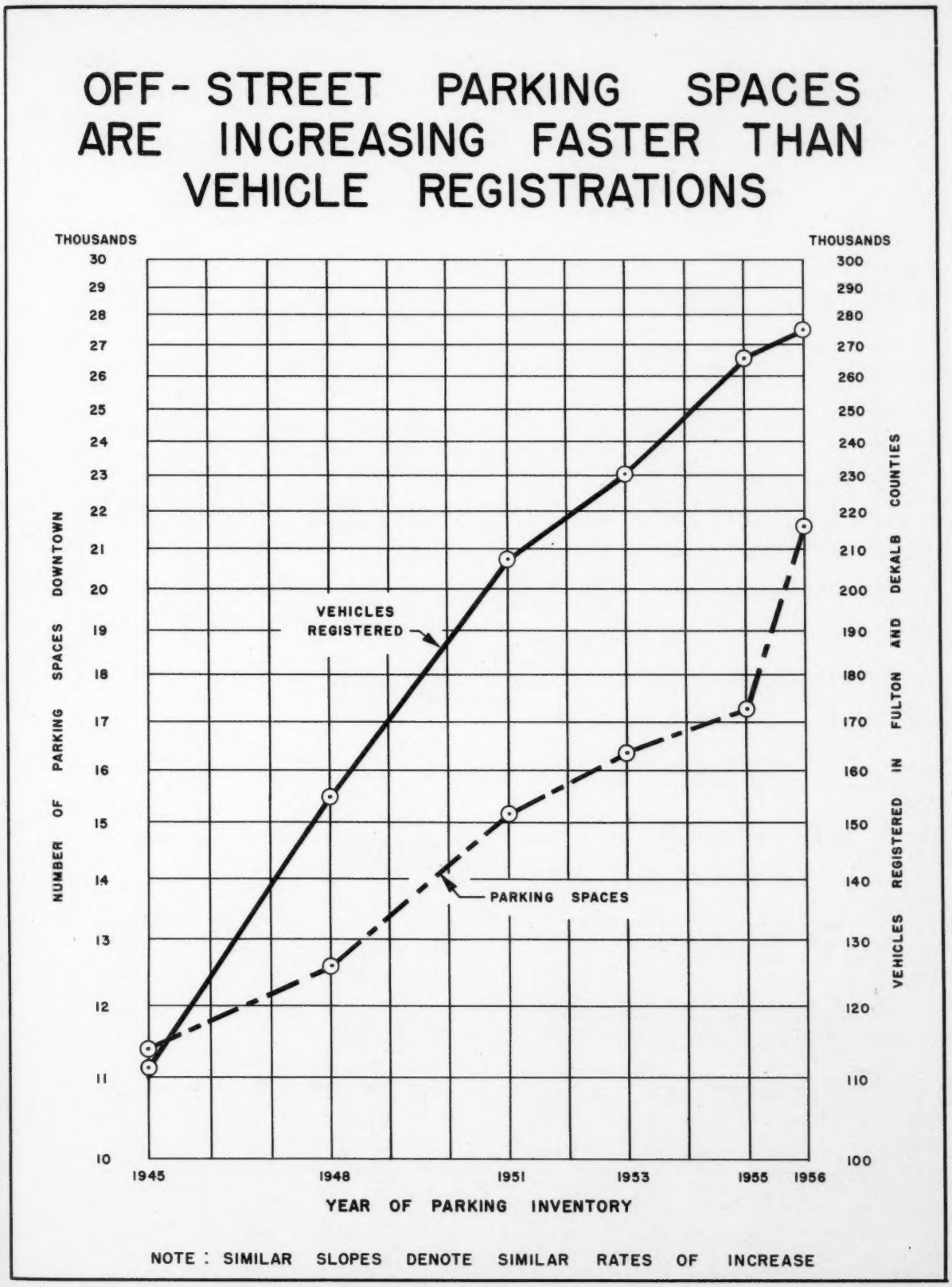


Figure 1

Figure 1 provides a comparison between the rates of change in off-street parking spaces and vehicles registered in the two counties in which Atlanta is located. A semi-logarithmic scale was selected for this graph since equal slopes indicate the same relative, or percentage, change in quantities, whether it happens to occur among low or among high values of the series. This graph indicates that vehicle registrations increased rapidly for several years after 1945 but have leveled off in recent years. Parking spaces, on the other hand, have shown a greater rate of increase during the years following the adoption of a private enterprise system of off-street parking.

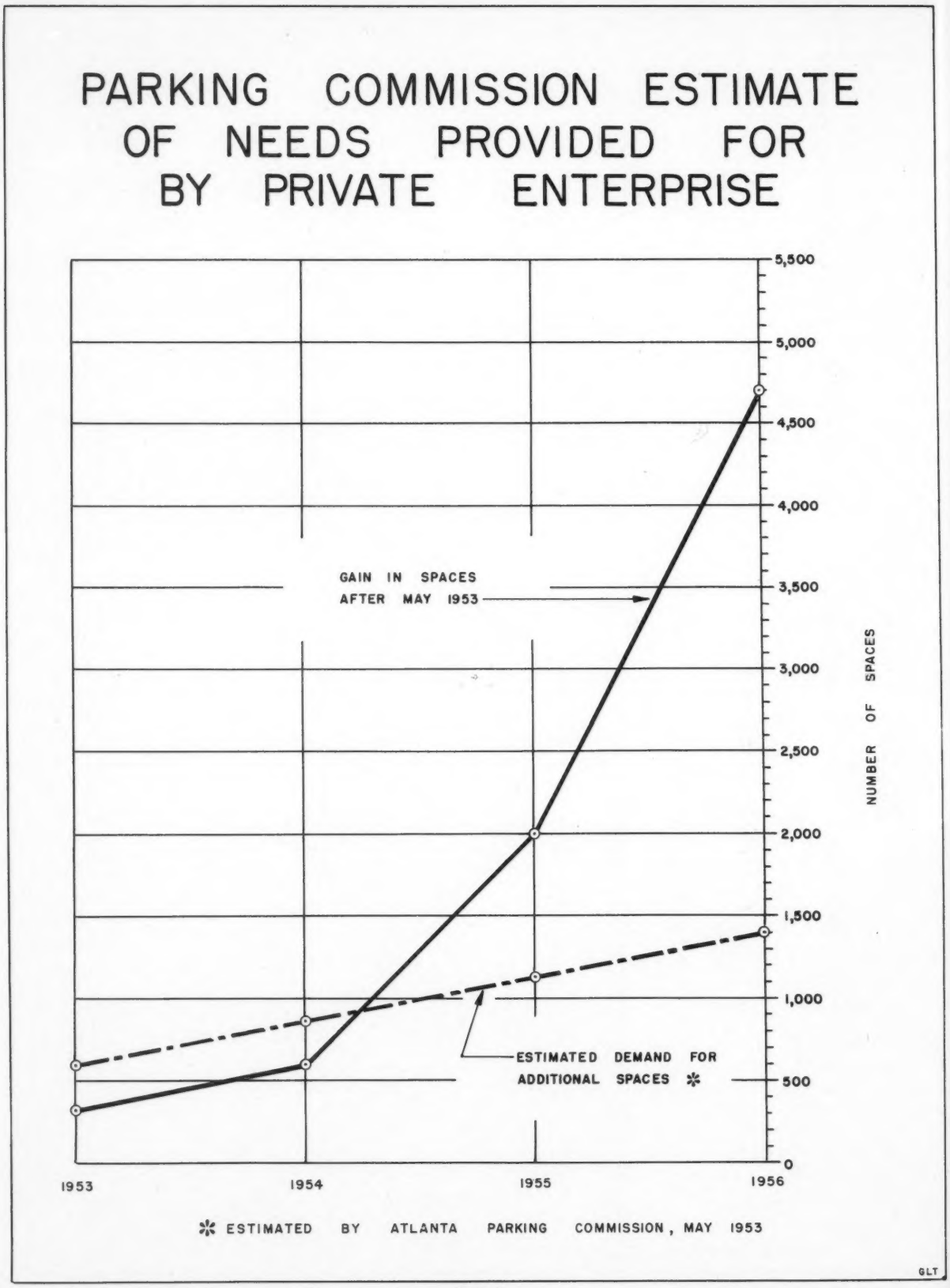


Figure 2

Figure 2 shows, by the broken line, the number of spaces which the Atlanta Parking Commission indicated should be progressively added to the 1953 supply in order to meet the increasing demand. The solid line shows the actual number of spaces added through the end of 1956. The chart shows that the 1953 Parking Commission estimated a need of an additional 1,401 spaces by 1956; however, by that date there had been an overall gain of 4,686 (including a loss in curb spaces)—or three times as many new spaces as the need estimated by the 1953 Parking Commission.

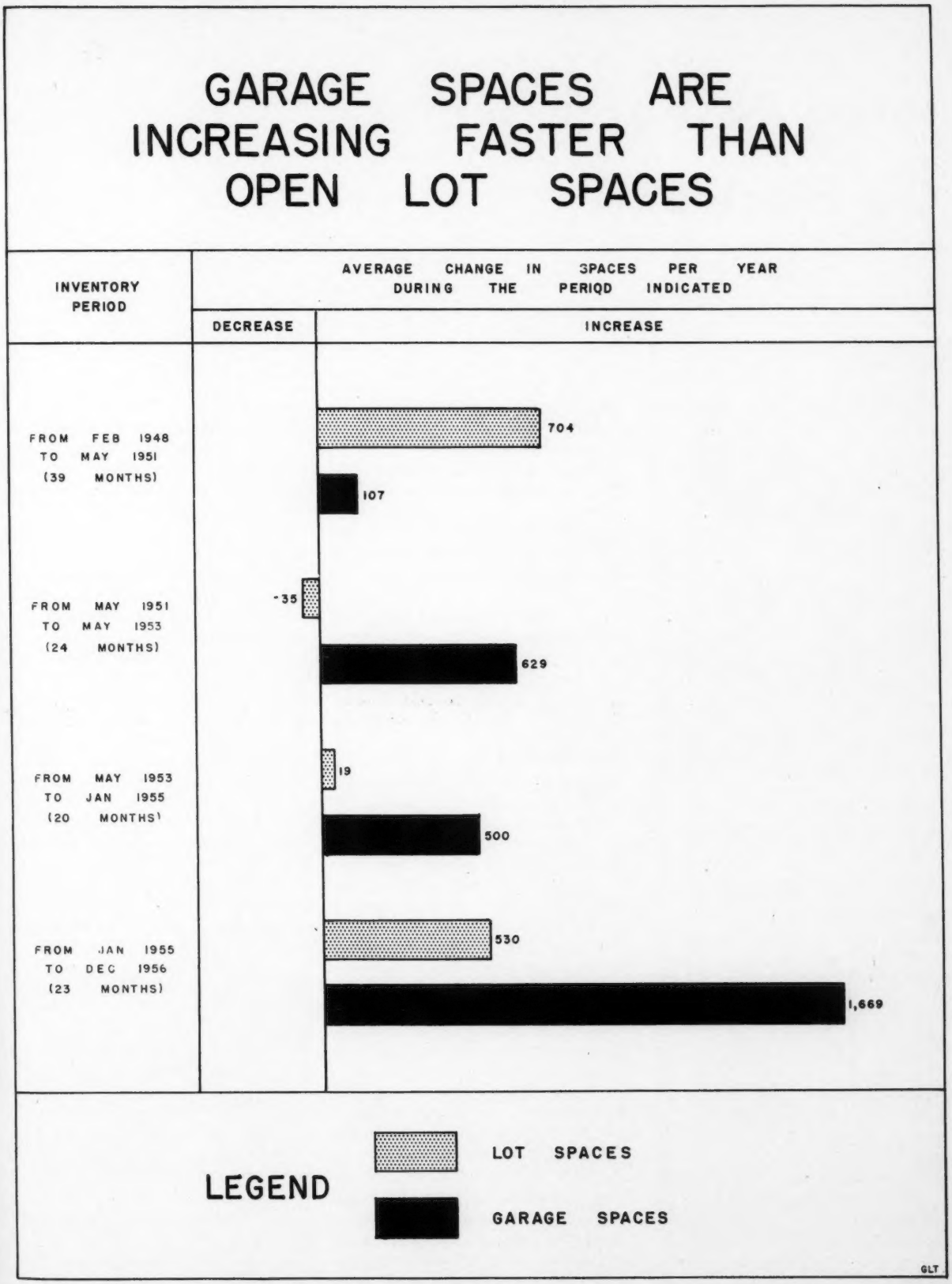


Figure 3

Figure 3 is a graphical presentation of the data in Table 1 and shows the average yearly rate at which the supply of parking spaces changed between inventories. The greatest increase occurred during the twenty-three month period between January 1955 and December 1956 when garage spaces increased at the rate of 1,669 per year and the lot spaces increased at 530 spaces per year for at total of 2,199 spaces per year.

Iowa Research Scales Go Electronic

By J. J. Heatley
Smithtown, N. Y.

Figure 1
Tandem axle semi bearing down on electronic scale platform at Tama, Iowa. Truck speeds over platform are about 15 to 20 miles per hour. Note barrier at right and flags to channel traffic into electronic scale lane. Platform is concrete, 3' x 11' in size.

TRAFFIC ENGINEERS with the Iowa Highway Commission may now rightfully be assigned the role of "pioneers" in the practical application of electronic truck motion weighing for research. After three years of experimental checking on a single electronic scale installation, orders have been placed for nine additional units, and beginning with the survey work in 1958 all truck axle weights for research will be taken electronically with the truck in motion.

Electronic weighing is not new. It has been used for weighing aircraft statically since 1943. Electronic motion weighing has been accepted for freight cars in railroad classification yards since 1949. Weighing trucks in motion, however, is relatively new, and has been the subject of a number of reports at association meetings, and in publications in the past several years. Perhaps the best known report was that of Normann and Hopkins of the Bureau of Public Roads in Highway Research Board Bulletin No. 50. Here the original prototype motion weighing equipment was described together with the results of extensive tests on an experimental installation on the Shirley Highway south of Washington, D. C. The aura of experimentation has persisted in following electronic truck weighing projects until this recent conviction of the Iowa personnel that the new technique had practical application.

Carl Schach, Iowa's Traffic and Safety Engineer feels the new technique has a number of substantial advantages over older methods of securing this data. First and foremost on Schach's list is that of survey crew safety. He says, "Increasing traffic and vehicle speeds have increased the hazards the 12-man crew is subjected to each year. We feel that weighing operations in the future using electronic scales can be conducted with far greater safety to both the traffic and operating crew than is now possible under present loadometer operations." Iowa fortunately has had no serious personnel accidents in the past. Near misses however, during weighing operations pointed up a serious problem that needed early solution. This was the prime reason leading to the experimental installation of one electronic motion weighing scale at Tama, Iowa on Route 30. Of particular concern was the fact that so many of the loadometer crew were made up of summer student employees who lacked experience in dealing with high traffic volume situations in a safe manner.

Also on Schach's list was the matter of economics. Past Iowa axle weighing research operations were handled by a 12-man crew. Of this group only the party chief was a permanent Highway Department employee. Studies were made only during the summer utilizing student personnel. Plans for the future include a year around weighing research program which would need a permanent crew of 12. The new electronic equipment will accomplish the job with but three permanent crew members incurring savings on a 12-month basis for salaries, expenses, and transportation of nine men.

Iowa's three years of experimentation and their practical approach to the electronic weighing technique has developed several interesting innovations. First, they have induced the manufacturer to design an indicator/recorder that will be "common" to multiple load cell platform installations. A single instrument will be used to readout axle weights from 10 different load cell roadway platforms throughout the state. The weighing platforms, 3' x 11', will be permanently installed in one lane of a two lane highway. Traffic from both directions will be directed over the scale using a barrier system. Experience at the Tama scale proved this approach to the problem satisfactory. Utilizing a single instrument for all platforms has eliminated the expense of acquiring right of way for housing equipment at each weighing site, and of course the expense of constructing a weighing house. When surveys are not underway the all important instrument is kept in the Department shop where it may be checked and serviced. Optimum storage conditions as opposed to freezing cold or conditions of high humidity at each site prevents breakdowns and reduces maintenance.

A second novel contribution to research weighing techniques involved the modification of a "used" school bus to not only house the scale indicator, but also all ancillary equipment necessary to the operation, i.e. barriers, signal flags, road tubes and

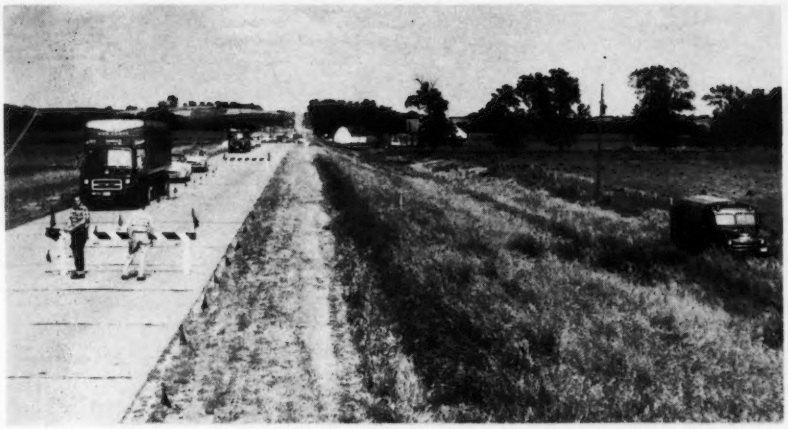


Figure 2
Iowa's electronic weighing program in operation. Truck rear axles are about to pass over platform. Barriers are erected about 100 feet apart. Bus is far enough from highway not to add congestion. Two men control the traffic and one man operates the instrument in the bus.

switches, signs, spare parts, and extra tapes. A stove has been installed to keep the crew warm, and a large work table or desk is installed laterally to encourage proper weight tape classifications and record keeping. Each piece of equipment has its own stowage compartment.

When a particular platform number is up for an axle weight study it takes only a matter of minutes to uncoil the instrument cable from the "bus" and plug it into the roadside weatherproof junction box containing the platform "load cell" leads. Erecting the barriers, signs, and flags occupies the crew for but another 10 minutes. In 15 minutes maximum, the 3-man crew are ready to record 100 per cent of the truck axle weights. One man is stationed at each end of the single lane road section containing the platform to control the traffic direction, and the third man remains in the truck to monitor the recording instrument.

Figure 3
Iowa's "weigh station bus" parked in the field along side highway lane containing electronic scale platform. At locations where public service power is not available, a motor generator unit will be used to supply the required 110 volts and 60 cycles. Several hundred feet of cable between the instrument and the platform junction box allow plenty of freedom in selecting a bus parking place. Bus was modified for electronic weighing project by Iowa Highway Department personnel.

Iowa survey periods are usually of eight-hour length. Because of the single lane operation, trucks pass over the scale at about 15 miles per hour. At Tama there has been little or no waiting at the barriers. Traffic seems able to move freely under this setup in spite of the single lane restriction. In any case there is no build up of waiting trucks, nor any trucks missed as under the old loadometer weighing practice.

When operations for the day are concluded, the instrument is unplugged, weight tape classified, signs and barriers stowed away, and the "weigh-station-bus" wends its way onward to the next research platform on the schedule.

Iowa engineers have concluded after many tests that the axle weight accuracies obtainable by motion weighing, and electronically, are acceptable. Much thought has been put on the validity of comparisons between conventional stationary weights taken on a standard lever pit type scale and the electronic motion weights. Schach feels strongly that accuracy conclusions drawn from a comparison of static and motion weights are like adding apples and oranges. Truck wheel unbalance, wind resistance, gusts, suspension system design and vibration, acceleration and deceleration all tend to influence the weight reading of axles in motion. The electronic scale simply records the vertical components made up from all these influences together with the weight vector. This is the load the pavements must resist if trucks are to "*move*" down the highways! To complain that axle weights in motion are "high" when compared to the static weights is perhaps a credit to the electronic scales rather than a debit. Schach claims as a conclusion from his own tests, "In a comparison study between axle weights on a pit scale and by the electronic scale it was found that 20 per cent of the axles weighed heavy by more than 5 per cent, and only 5 per cent weighed light in motion. Fifty per cent of the vehicles weighed in motion were within 2 per cent of the static weights."

Some of the inaccuracies may certainly be traced to characteristics of the present equipment. Axle weights are traced on cross sectional tape by a heated stylus. A two-inch sweep of the stylus might represent a spread of 35,000 pounds depending upon the setting of the instrument. Picking off weights from such a compressed scale to within plus or minus 500 pounds is sometimes difficult. Schach feels that

(Continued on page 50)

Figure 4
Interior of bus shows operator at electronic scale recorder. His main job is to conserve tape by culling out passenger vehicles and observe the instrument operation for zero balance. Note wide work table, stowage racks for signal flags, and good visibility.

Figure 5
Junction box by side of highway to which cell leads are brought from platform foundation. Instrument in bus has long cable and is "plugged" into this facility. Junction box is mounted on short pipe length, is water tight, and key rides along with crew.

Theory of Speed Zones in Developed Areas

by John E. Baerwald
(Mem., I.T.E.)
Professor of Traffic Engineering
University of Illinois

Originally presented at the University of Wisconsin Traffic Engineering Institute, February 20, 1957.

TRANSPORTATION is an essential element in the dynamic society found in present-day America. Not only is it essential that persons and goods be moved from place to place, but great emphasis is placed on the fact that this movement be made rapidly and comfortably. Thus we find that speed is a primary factor in all modes of transportation. In the realm of highway transportation speed is not only one of the most discussed factors but it also is one of the most controversial factors. Every traffic expert, whether professionally qualified or self-designated, is usually ready and willing to discuss the speed problem during the course of the daily conversation. Such terms as "Speed is the greatest contributing cause to traffic accident severity," "Speed still public enemy No. 1," "Speed kills," "Radar speed arrest increase," and "Nobody obeys the speed limit," may be heard or read with increasing frequency.

Because many recognized traffic specialists disagree on various factors of the so-called speed problem, it is not surprising that the general public has many varied and often diverse opinions concerning speed. Consequently, it might be well if the term "speed" be stated as defined by the American Association of State Highway Officials: "Speed—the rate of movement of a vehicle, generally expressed in miles per hour." The term "speed" is an indication of velocity; however, as commonly used, the term "speed" implies high speed. The question may then be raised, "Well, what is meant by the term 'high' speed?" Not only would a description of this adjective vary between different individuals, but each individual would probably change his definition in accordance with the existence of other conditions present on or off the highway. Such items as visibility, weather, surface characteristics, vehicle type, traffic movements and volumes, pedestrians, driver variables, and so on, might all influence the answer. It is therefore essential that all those who are actively engaged in the battle against traffic accidents and congestion have a clear understanding of the many facets of the so-called speed problem.

The Need for Obtaining Vehicular Speed Data

As mentioned previously, speed is a primary factor in all modes of transportation. Vehicle operating speeds are influenced by, as well as influence, other factors such as operating costs, character of cargo, type of vehicle, and so on. Thus it is essential that certain operating characteristics and driver habits be observed for the variable conditions existent on the highways and streets of America. Two different types of observations are essential: namely, spot observations and trend observations. The spot observations are utilized to obtain data at a given location in a given period of time, while the trend studies may be made at the same or at many locations at different periods of time.

The traffic engineer needs speed data in each of the three main areas of his professional interest; namely, traffic operations, geometric design, and planning. Traffic operation uses of speed data include the establishment of speed zones, and the determination of lengths of no-passing zones, advisory speed indications at curves, traffic sign locations, traffic signal timing and locations, the relationship of speed to accidents, and the determination of whether prevailing speeds are too fast for conditions. Before and after speed studies may also be an indication of the effectiveness of any improvement measures.

Geometric designs assume a uniform speed. This uniform or design speed has been defined by AASHO as "A speed determined for design and correlation with the physical features of a highway that influence vehicle operation. It is the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern." The length of speed change lanes and the respective amounts of horizontal curvature, superelevation, and sight distances are directly related to and vary appreciably with the design speed.

Economic justification often plays an important part in traffic planning. Speed data therefore is utilized in determining benefit cost ratios for proposed improvements and/or routings. Speed studies as such are also considered as essential parts of the fact-finding phase of a traffic planning program.

The speed adopted by a driver varies with four main conditions; namely, (1) the physical and operating characteristics of the highway, the driver, and the vehicle; (2) the weather; (3) the presence of other vehicles; and (4) speed limitations, whether they be legal or control devices. Because speed does vary as these conditions vary, it is essential that observations of vehicular speeds be made with either the conditions minimized, or sufficient observations must be made for each of the several possible combinations of conditions. All too often in the past, definite conclusions concerning "the speed problem" were based upon inadequate, if any, factual data.

Speed Measurement Techniques

Various types of speed measuring equipment are well described in the literature, and time will not be taken here to discuss the various pieces of

equipment and their operational techniques. Care must be taken in using any speed measuring device that first it be properly calibrated; secondly, that it be properly installed and placed; and thirdly, that it be properly operated and maintained. Even a slight disregard of any of these conditions can appreciably affect the results obtained during an observation of motor vehicle speeds. Care must also be taken that the speed observation site be properly selected so that representative vehicles may be observed.

Improper placement of the equipment on the roadway may seriously influence driver operating characteristics. With the increasing use of speed measuring devices utilizing pneumatic rubber tubes or little black or green boxes placed close to the road, the public has become more wary of any strange vehicle or persons watching traffic with more than average interest. Means of camouflaging the observation installation have been tried with marked success by several different agencies.

The techniques for determining what size of sample is to be observed and also how the data shall be recorded also vary widely. Some organizations obtain a fixed number of vehicles, while other utilize a time base in determining the length of observation. Some units observe just "free-flowing vehicles" while other units record all speeds that may be read from the meter. It is essential that the sample be of such size as to provide data that will be adequate for statistical analysis. One must also be sure that similar conditions are present if results are to be comparable. This is particularly true in before and after, trend, or characteristic studies. Such items as the effect of volume on speed, percentage of commercial vehicles in the total traffic stream, and the location and causes for delays and stops, must also be considered.

The University of Illinois, in conjunction with the Illinois Division of Highways, is presently engaged in a research project on vehicular speed regulation. One of the initial phases of this investigation is an attempt to determine if any speed characteristics might be considered common for certain traffic conditions. Thus such variables as roadway design, vehicular volumes, vehicular classification, and so on, are catalogued and sites are selected which will have certain common characertistics and certain variable characteristics. Twenty-four hour studies are then made of these sites in an attempt to determine if there is any pattern to the speed behavior for a given set of conditions. Such questions arise as to when in the daily cycle are the average speeds most representative of the total daytime speeds or the total twenty-four hour speeds. On the basis of inconclusive but preliminary observations made to date, it appears that the most representative time to observe speeds might be immediately following the morning rush hour. This conclusion still has to be verified for many different types of station conditions before it can be considered reliable.

The observations made to date also appear to indicate that there is little if any difference in the results obtained by observing "free-flowing" vehicles and observing all vehicles.

Care must also be taken that proper statistical techniques be utilized in the analysis of speed data, and it is essential that the reports describing the observations are complete. For example, a statement saying that the average speed on Highway 41 is 62.9884 miles per hour means little to the trained traffic official. He needs other information before he can accept this statement. For example, where on Highway 41? When were the speeds obtained? How many speeds were obtained? How were they obtained? Is this figure representative of all vehicles or for just certain classifications of vehicles? Is the figure for a twenty-four hour period, or for what time period is it representative? In fact, is it representative at all? Or is it an average value which might be greatly influenced by extreme values at either the high or low range of the scale? The trained official would also desire such information as the various percentile speeds. He would like to see a cumulative frequency curve and possibly a frequency polygon. He would be interested in the speed differential, that is, the difference between the relatively high and relatively low speeds at the same location. This might possibly be the difference in miles per hour between the 85th percentile speed and the 15th percentile speed. Any other pertinent factors should also be recorded, such as road surface conditions, weather conditions, and so on.

A different phase of the Illinois speed research project is directed toward the development of statistical tables which will simplify the selection of a sample size which will provide a desired degree of accuracy. Another type of table is being developed where, for a given sample size, the observer merely need record the field observations in order from lowest to highest values, and then from the table determine within what values, say, the arithmetic mean value lies, or within what values can he find the 85th percentile with 90, or 95, or 99 per cent confidence.

Vehicle Speed Characteristics

Many governmental organizations have conducted speed studies of some type or other. Most of these have been of the trend type wherein periodic observations are made and the changes from one observation to another are thereby obtained. In Wisconsin, for example, the Highway Commission has made daytime observations on unzoned highways for every year from 1946 to date (1).* One of the advantages of this series of studies is to show the relative effect of the incorporation of a statewide 65 mph daytime speed limit. As shown in the table below, there was a steady increase in

*Numbers in the parentheses refer to references in the bibliography.

RURAL DAYTIME VEHICULAR SPEEDS ON UNZONED HIGHWAYS IN WISCONSIN

	No. of	*Passenger Cars*		*Heavy Trucks*	*All Vehicles*	
Date	*Locations*	*Wis. Avg.*	*Non-Wis. Avg.*	*Average*	*Avg.*	*85-per.*
1946	15	47.8	51.1	42.7	47.8	55.3
1957	15	48.4	52.8	44.4	48.7	56.0
1948	15	48.3	52.7	42.6	48.1	57.2
1949	13	49.9	55.4	46.7	50.7	59.4
1950**	7	51.3	54.5	44.6	50.9	59.9
1951**	7	50.6	53.5	44.7	50.2	59.5
1952**	15	52.7	56.2	45.9	52.1	61.6
1953**	15	53.4	56.1	45.6	52.3	62.1
1954**	15	54.0	57.0	45.2	52.8	62.1
1955**	15	55.9	59.3	46.7	54.5	63.9
1956**	15	55.6	57.6	44.8	53.4	62.8

**65 mph speed limit in effect.

the average speed of both the Wisconsin and non-Wisconsin passenger cars following the adoption of the speed limit in 1950 up to the 1956 observation when a decrease in the average speed was observed. It will be interesting to note in this year's report whether the decrease will continue or whether the increasing trend will be resumed.

Other states such as Indiana and Michigan have also made trend observations over the years and it is also interesting to note that both of these states have observed increasing average speed following incorporation of fixed speed limits instead of the basic rule of reasonable and prudent speeds. The Michigan State Highway Department made before (April 1955) and after (April 1956) state-wide speed studies to study the effect of the new 65 mph speed limit (2). The following resumé is from the published Michigan report:

COMPARISON OF AVERAGE DAYTIME SPEEDS IN MPH. ON RURAL STATE HIGHWAYS

	All Vehicles	*Passenger Cars*	*Commercial Vehicles*	*Buses*
Before	51.9	53.8	45.1	54.0
After	52.7	54.3	45.8	57.2
Percentage of Vehicles Traveling Over 60 mph.				
	All Vehicles	*Passenger Cars*	*Commercial Vehicles*	*Buses*
Before	18.4	23.1	1.9	18.2
After	20.6	25.3	1.6	31.4
Percentage of Vehicles Traveling Over 65 mph.				
	All Vehicles	*Passenger Cars*	*Commercial Vehicles*	*Buses*
Before	8.0	10.3	0.3	6.1
After	7.7	9.5	0.1	20.0

(Based on 6,388 vehicles observed in 1955 and 5,705 vehicles observed in 1956.)

Average or arithmetic mean speeds are also increasing on a national basis. The latest Bureau of Public Roads report indicates that the 1955 value for passenger cars was a record high. The table shown below is based on a BPR compilation of speed studies conducted in 33 states (3).

NATIONAL AVERAGE (MEAN) SPEEDS (ALL VEHICLES)

1941 — 47.1 mph.	1952 — 49.5 mph.
1942 — 36.0 mph.	1953 — 49.8 mph.
1948 — 47.7 mph.	1954 — 50.0 mph.
1950 — 47.4 mph.	1955 — 50.7 mph.

1955 U. S. AVERAGES AND PERCENTILES

Vehicle Type	*Average mph.*	*Percentage over 55 mph.*	*Percentage over 60 mph.*
Passenger cars	52.1	37	18
Trucks	45.8	11	3
Buses	52.6	47	21
All	50.7	31	15

The New York State Department of Public Works has conducted some specialized speed studies which are of interest. One study was concerned with the speed habits of automobile drivers observed repeatedly on a rural highway (4). The major findings from this study are:

(1) "Higher speeds are associated with younger drivers, larger amounts of travel, and newer cars. But no combination of these factors could explain more than a small fraction of the total variation in average speed."

(2) "The variation in speeds of the same driver on different days is greater, on the average, than the variation among the average speeds of different drivers."

Another study was concerned with the relation of accidents to speed habits and other characteristics of drivers (5). The major findings of this study are:

(1) "Faster drivers have more accidents than slower drivers especially when judged by their speeds in the afternoon."

(2) "Drivers who have very short headways in the morning have more accidents than those who do not."

(3) "Higher accident records are associated with younger drivers, larger amounts of travel and newer cars."

A third New York study related to speed observance on vertical curves (6). The major findings of this study are:

(1) "As drivers approach vertical curves with short sight distances (between 150 and 500 ft.), they invariably reduce their speeds to some extent. The reduction in speed, however, is for less than that required to provide safe operating conditions regardless of the criterion used for determining safe conditions."

(2) "No consistent relation exists between operating speeds at the crest of vertical curves and the minimum sight distances."

(3) "A minimum sight distance of 400 feet to a 4-inch object is necessary to accommodate the driving habits of 85% of the drivers."

(4) "Driver performance on vertical curves in terms of operating speeds bears no relation to the safe speed as determined by various design standards."

A major portion of the speed studies reported in the literature deal with rural conditions. Speed, as such, is just as critical in urban areas, and many of a driver's rural speed habits are carried over to his urban driving. It has been repeatedly observed that the average speed on urban streets is also increasing wherever possible. While many speed studies have been made by urban officials, very few of these have been published.

An intearesting urban study was made under the direction of Professor C. C. Wiley of the University of Illinois, Champaign, Illinois, in the fall of 1947 and the spring of 1948 (7). Observations were made on two residential city streets carrying state and federal highway routings. Both streets were posted with 25 mph signs and speeds were observed with these signs in place. The signs were then replaced with 35 mph signs on one street and 30 mph signs on the second street. Speed observations were made one and four days after the change. All speed signs were then removed on both streets so that no posted speed limits whatever were displayed. Observations were again made one and five days after the change. Twenty mph signs were then erected and measurements made at intervals of one and five days after the change. The original 25 mph

signs were then restored and sufficient observations were made to show close correlation with the initial observations. During the study there was no change made in the enforcement program and no public announcement or any other publicity of the study. An analysis of the field data indicated "that the speed ranges and variations were so nearly alike in all cases for the same street as to demonstrate clearly that the posted limits were entirely ignored and traffic ran at "natural" speeds, irrespective of whether the signs read 20, 25, 30, or 35 mph, or whether there were no signs at all." The following conclusions were drawn in the study:

1. "Traffic consistently ignores posted speed limits and even the absence of speed limit signs, and runs at speeds which the drivers consider reasonable, convenient, and safe under existing conditions."
2. "Drivers do not operate by the speedometer but by the conditions they meet."
3. "The general public gives little attention to what speed limits are posted."
4. "The general public has a false conception of speed."
5. "Most present posted speed limits are ineffective because they are unreasonable and hence are useless. Their removal would have virtually no effect on traffic and would save large sums of money."
6. "Speeds vary little with the time of day."
7. "Speeds vary little with traffic volumes up to the point where congestion begins."
8. "Adequate speed limits, high enough to cover normal traffic operations and enforced with only sufficient tolerance to meet unusual conditions or cover the usual inaccuracies of stock speedometers, would probably help expedite traffic and aid in the enforcement of *all* traffic regulations."
9. "Extensive additional studies of this nature are needed from which to derive data for an intensive campaign of education for both the general public and the public officials on the true concepts of speed limits."
10. "A sound definition of speed limit should be developed and universally adopted."

The Illinois Division of Highways is currently studying speed data collected at 193 urban and rural stations where speed zones were either established or revised. These stations are on different types of highways. Investigations of this nature are to be encouraged for they enable a study of the effectiveness of the change. Publication of the results can contribute to the overall knowledge of driver behavior relating to vehicle operating speeds.

In urban areas it is not only the operating speed, but also the travel time that is of interest. Consequently, travel time or speed and delay studies are very useful to the urban traffic official. Matson, Smith, and Hurd found from these types of studies that the average over-all speed in cities ranges from 3 mph in dense business areas to 35 or 40 mph in limited lengths of route in outlying residential territories. In cities where radial routes from the center of the central business district to the outer periphery of urban development are present, the over-all speed usually falls between 15 and 20 mph. Delays in urban areas for city-wide travel occur on an average of two to three times per mile, and as often as ten to twelve times per mile in dense business districts. The average vehicle is delayed 40 to 60 times per hour of city-wide travel and as much as 70 to 80 times per hour in the central business districts. The duration of a single traffic delay under usual urban conditions is 0.25 to 0.40 minute, ranging from 0.1 minute to 0.6 minute. The total time lost through delay ranges from 15 to 16% for city-wide travel and from 35 to 50% for dense central business district travel. Thus the running time is about 85% of the total travel time for city-wide travel on radial routes and 50 to 60% of the total travel time in the dense business districts (8).

Speed Zoning

The speed characteristics along a given section of street or highway can be greatly influenced by the level of enforcement along that street of highway. The attitude of the courts is also germane to the problem of trying to get people to operate their motor vehicles at velocities which will enable the driver to safely maneuver the vehicle under normal conditions. Inasmuch as the general public must accept any law or conversely, the law must follow the will of the public, it is essential that engineering and enforcement personnel take the lead in educating the public as to how proper scientific speed zoning is not only beneficial but is essential to the public welfare. Much has been said and written about the pros and cons of "get tough" policies and increased enforcement of speed limits.

Speed zones, like other traffic control devices, are not a panacea in themselves, and consequently it might be well that before existing speed zones be utilized in enforcement programs that they be re-evaluated in a scientific manner as to determine whether they are properly designated or possibly even necessary. A suburb of Chicago recently requested that a 30 mph zone be changed to a 20 mph zone. The reason for the change was given that something had to be done about the high speeds along the route in the central business district. This route, which also carried a state highway routing, was observed with accepted speed study techniques, and it was found that under the present speed limit, 30 mph, over 80% of the traffic exceeded the speed limit. Here then is a case where the officials are going counter to public opinion by trying to change a limit which already is too low in the public's eye to an even lower limit. The local officials also stated that they expected to utilize the same level of enforcement with the proposed limit. The question then arises as to how a police force which cannot enforce the exisiting limit will be able to better enforce an even lower limit.

Another city proposed to reduce its so-called high speed problem by changing the stop signs from the cross streets to the through streets. Needless to say, this action, like speed limits which are set too low, did not help to solve the speed problem but added to hazard and congestion.

Because every citizen considers himself a traffic expert, he is always ready to recommend changes which will benefit him with no regard to the possible effects on the other drivers. All too often the underlying basis for his opinions concerning changes in speed zoning and other traffic control measures is to regulate the other driver, but the regulation will not apply to him because he is an above the average driver. Thus we often find that local residents are greater violators in the strictest sense of traffic regulations than non-residents.

(Continued on page 39)

Traffic News

Signs Tested for Use On Interstate Highway System

Signs were under test last month in an effort to find the best size, color and design for use on the Interstate System. The American Association of State Highway Officials and the Bureau of Public Roads cooperated in the experimental work.

Figure 1

Figure 2

Figure 3

Figure 1 shows three signs erected on a new Maryland road near Washington. The roadway was not open to traffic but the test cars could operate past the signs. Screens or curtains were provided so that only one sign would be visible at a time.

Figure 2 shows one of the 16 x 20-foot signs, which dwarfs the two men standing by it. The signs were of different background colors and bore the new red, white and blue Interstate marker recently adopted.

Figure 3 shows one of the overhead signs, which also used different background colors and which used capital as well as lower case lettering. A shield is provided which can be pulled in front of the sign to block it out when it is desired to view another of the overhead types.

Observers representing all types of drivers made hundreds of observations of the several signs to determine the most legible and distinguishable type and color.

O & D Study Made by Continuous Sample Technique

The first application of the continuous sampling technique to vehicular origin and destination studies will be inaugurated by The Port of New York Authority in early December for automobiles and trucks moving into and out of the New York-New Jersey metropolitan region at its six interstate vehicular crossings. The new system, in which a limited number of interviews will be conducted with motorists throughout the year, will furnish more accurate and faster data than the former method of intensive questioning for a relatively short period of time.

The results of interviewing a small but representative sample on a continuing basis will be used to determine the patterns of travel of the traffic using the Lincoln and Holland Tunnels, the George Washington Bridge, Goethals and Bayonne Bridges, and the Outerbridge Crossing.

Changes in traffic patterns due to population shifts, the opening of new highways and other vehicular facilities, and the steadily increasing number of cars on the road make the most accurate and up-to-date origin and destination information essential in the planning of new facilities and the most effective use of the present ones. The continuous sampling program measures seasonal traffic variations and minimizes inaccuracies caused by unusual weather or other unique circumstances often encountered in the three-day surveys used previously.

Less inconvenience will result to the motorist under the new scheme than was the case under the former "blanket" survey. Formerly, origin and destination surveys were held at three-year intervals. During these surveys about one in every four motorists using Port Authority crossings were questioned in a three-day period. Under the new system, the chances that any particular motorist will be questioned during the period of a year will be about one in 650. It is estimated that the entire interview will take about fifteen seconds and will not delay traffic.

It is planned to interview on a twenty-four-hour schedule during the entire year at the various tunnels and bridges. There will, however, be only one interviewer questioning motorists at any facility at any one time. The information to be gathered will include the origin of the trip; the destination; the type of vehicle, i.e. auto, truck, tractor-trailer, etc.; the number of people in the vehicle; and the state in which it is registered. The purpose of the trip will also be determined.

The method was worked out by the Port Authority in cooperation with officials of the United States Bureau of Public Roads, and with the Survey Research Center of the University of Michigan. Extensive field tests were made to insure that the method was actually practical in advance of inauguration of the program.

Intensive Investigation Of Accidents Planned to Discover True Causes

A three-year research program to determine the possibilities of obtaining information on the nature and causes of traffic accidents through intensive scientific investigation has been launched at Northwestern University.

Financed by grants from the Automotive Safety Foundation and the federal government, the project will be the most extensive of its kind ever undertaken, according to Ray Ashworth, director of the Traffic Institute.

He announced that grants totaling $105,000 have been received by Northwestern University to finance the project's first year. The U.S. Bureau of Public Roads provided $50,000 and

the U.S. Public Health Service contributed $45,000. The remainder came from the Automotive Safety Foundation. Cost of the program over the three-year period will be approximately $350,000.

An operating committee of Northwestern University scientists will direct the study. Committee members are J. Stannard Baker, director of research and development, the Traffic Institute, chairman; Robert B. Banks, professor and chairman of the department of civil engineering in the Technological Institute; Dr. Edward S. Peterson, director, graduate division, Medical School; Robert I. Watson, professor of psychology, college of liberal arts, and Robert F. Winch, professor of sociology, college of liberal arts.

Speaking for the committee, Baker, one of the nation's leading authorities on scientific accident investigation, stated:

"We shall attempt to develop methods for gathering more precise factual information about accidents that will be useful to scientists trying to discover how vehicles, roads, and especially drivers and pedestrians contribute to accidents."

He pointed out that studies of the National Committee on Uniform Traffic Statistics revealed that present traffic accident reports made by drivers and police yield little useful information about causes of traffic accidents.

Although these sources may indicate the number, type, severity, and location, this information is of value only for routine statistical and administrative purposes.

If accident data is to be gathered in a manner to permit significant scientific conclusions from the study of traffic accidents, scientists must specify the data to be gathered and how it must be recorded, Baker maintained.

According to research procedures outlined by Baker, a mobile three-man team consisting of a medical scientist, an engineering scientist, and a social scientist will be employed by the committee to investigate traffic accidents under a wide variety of road, traffic, lighting, and vehicle conditions.

Arrangements will be made with police agencies in an area representing great varieties of traffic conditions to communicate with this team immediately upon occurrence of specified types of accidents.

Each member of the team will concentrate on the aspects of accidents relating to his particular field, Baker said.

The engineer will examine and record damage to vehicles, marks on the road, and road conditions. The medical scientist will investigate physical conditions of the drivers involved. The scientist will test for absorbed alcohol and note injuries, signs of fatigue, illness, and bodily deformities.

In interviews with drivers about the events of the accident, the psychologist will try to uncover such contributory mental factors as distractions, preoccupations, the driver's thinking as related to his behavior prior to and during the accident, and the social forces acting on the driver that may influence his behavior.

On the basis of their findings and a later review of current theories of accident causes, the team will work for the operating committee to devise techniques of obtaining accurate accident information and methods of recording such information for scientific investigations.

"This case study program is a preliminary 'pilot' project," Baker emphasized. "It is not designed to come up in the first three years with the answers on traffic accident causes."

He said that during the two-year phase of the project involving field investigations, three to four days will be spent on each accident. Object of the study is to get experience with the greatest possible variety of accidents rather than extensive statistical samples.

"The facts we gather will have some value as such," he said. "But our primary concern is not to collect data; it is to explore the methods of collecting data, assembling it, and making it useful."

Following preliminary investigations, the research team will be augmented by a statistician to help plan data collection and storage methods best adaptable to statistical and other studies.

A report on highway research programs by a special advisory committee of the president's Highway Safety Conference in 1949 originally suggested the research project, Baker said. A major recommendation of this report was the "intensive investigation" of motor vehicle accidents to be carried on over a five-year period.

The need for such an investigation is acute, Baker pointed out.

"Precise information about accident causes is continually sought by driver license administrators, driver educators, courts, and highway, traffic and automotive engineers," he said.

"The problem today is to get people with the right training to seek and record facts about accidents very soon after they happen," Baker stated. "They must inquire carefully into the condition and background of the road, vehicle, and especially the people involved.

"We hope that our investigations will produce a workable system for additional research in this field."

2102 Miles of New Routes Added to Interstate System

New routes totaling 2,102 miles have been made a part of the 41,000-mile National System of Interstate and Defense Highways, Secretary of Commerce Weeks has announced.

They include the 1,000 mile expansion of the Interstate System authorized by the Federal-Aid Highway Act of 1956. The remaining 1,102 miles was made possible by estimated savings in mileage resulting from adoption of more direct locations of routes previously designated.

In developing the plan for the routes, Secretary Weeks said, consideration was given to proposals advanced by the various state highway departments for utilization of the 1,000 mile addition to the 40,000 mile Interstate System. He added that the Department of Defense had concurred in the action.

Secretary Weeks explained that the following four basic factors were considered in the choice of routes: (1) National defense; (2) system integration—the value of the route as a connector between numerous centers of population and industry which generate interregional traffic; (3) industry—transportation requirements of the manufacturing, agriculture, mining and forestry enterprises in the area traversed; and (4) population.

Under the 1,000 mile addition authorized by Congress in 1956, four city-to-city routes were approved for designation.

Ellensburg, Wash., to the vicinity of Pendleton, Ore., 132 miles.

Baton Rouge, La., eastward en route to Mobile, Ala., 91 miles.

Denver, Colo., to the vicinity of Cove Fort, Utah, 547 miles.

Fargo, N. D., to Sioux Falls, S. D., 230 miles.

(Continued on page 46)

New Appointments

Forbes Appointed Research Director For MSU Center

Theodore W. Forbes (Assoc. Mem., ITE), of the American Institute for Research, Pittsburgh, is the new assistant director in charge of research and professor of psychology at Michigan State University's Highway Traffic Safety Center.

Theodore W. Forbes

Dr. Forbes, 55, will direct and coordinate Center research activities, many of which are already under way in traffic engineering, economics, sociology and psychology as related to traffic operations. These include the cooperative projects recently announced between Michigan State University and the Michigan Highway Department and other federal agencies as well as individual projects of Center staff members.

For the past 25 years Dr. Forbes has been a teacher, lecturer and researcher specializing in highway traffic psychological and engineering problems, and has done considerable work under the Office of Scientific Research of the federal government.

He was born in Honolulu, Hawaii; received the A.B. and M.A. degrees from Oberlin College; the Ph.D. from Ohio State and was certified in traffic engineering at the Harvard Traffic Bureau.

He has held positions with the New York State Psychiatric Institute; Barnard College; the Harvard and Yale Traffic Bureaus; Stevens Institute of Technology; University of Pennsylvania; Harvard Psycho-Acoustic laboratory; University of Hawaii and the University of California at Los Angeles. Prior to his post as program director in charge of highway research at the American Institute for Research, Dr. Forbes was executive secretary and later technical director of the Committee for Highway Safety Research, National Academy of Sciences-National Research Council.

Pertinent research activities include highway sign legibility, driver tests, accident proneness, accident analysis, human engineering and psychological applications for traffic engineering and highway safety.

He is an associate of the Highway Research Board and committee chairman on Road User Characteristics; member of the advisory subcommittee on research, President's Traffic Safety Committee; individual member of the National Safety Council; and is a fellow in the American Academy for the Advancement of Science and the American Psychological Association.

Fisher New Public Works Director In Omaha

George J. Fisher (Mem., ITE) has been named Director of Public Works in Omaha. He assumed his new duties November 1.

Since 1953 Fisher has been Director of Service for Wichita. Prior to that he had worked in Ohio and in Oak Ridge, Tennessee.

Fisher, a native of Eaton, Ohio, attended Antioch College under the then new cooperative type college education plan. This meant five and one-half years of work part-time, study part-time in order to receive his engineering degree. He worked several years in the Steam Turbine Engineering Section of the General Electric Company. In June, 1930, he returned to Eaton and the education field — teaching physics, chemistry, and mathematics at the Eaton High School.

Next stop for Fisher was as Assistant Highway Engineer and then as District Traffic Engineer in Ohio. In 1940 he enrolled at the Yale Bureau of Highway Traffic. Upon his completion of the Yale course he returned to the Ohio Department of Highways as Assistant State Traffic Engineer. He served in this capacity until May, 1944, when he left Ohio to become Traffic Engineer for the City of Oak Ridge, Tennessee. After a one year period he again returned to Ohio as Assistant Traffic Engineer for the Department of Highways.

George J. Fisher

In May, 1947, Fisher became Superintendent of Streets and Sewers and Traffic Engineer for the City of Wichita, Kansas. He is a registered Professional Engineer in the States of Ohio and Kansas.

Tonti Elected President By Bridge, Tunnel and Turnpike Association

Dr. Louis Tonti, Executive Director of the New Jersey Highway Authority, which operates the Garden State Parkway, was elected President of the American Bridge Tunnel and Turnpike Association at its 25th Annual Meeting in Chicago.

The 39-year-old executive, who was Vice President of the Association during the previous year, takes over the presidency from Chairman Weldon B. Heyburn of the Delaware River Port Authority.

The Association membership represents 70 toll facilities throughout the nation and in Canada. Such major toll superhighways as the New York State Thruway, Northern Indiana Toll Road,

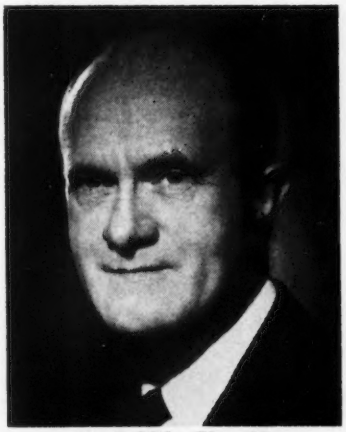
Pennsylvania Turnpike and the Garden State Parkway are members.

Mr. Tonti, who lives in Paramus, N. J., has been Executive Director of the New Jersey Highway Authority since the start of 1955. He served in an acting capacity during the first 10 months. The 173-mile Garden State Parkway operated by the Authority extends the length of New Jersey.

The election of Mr. Tonti as President climaxed a three-day meeting of the Association. Panel discussions, symposiums, presentations and exhibitions on various phases of toll facility operations marked the annual business meeting of the nation-wide group.

Flanakin Leaves ATA to Join Consulting Firm

H. A. Mike Flanakin (Member ITE) has joined the staff of Charles M. Upham Associates, consulting engineers in Washington, D. C. Flanakin, who has been Highway Engineer for American Trucking Associations for several



H. A. Mike Flanakin

years, will go to Bangkok, Thailand where the Upham firm has been retained by the Thai Government to advise on the development of a more complete department of highways.

Flanakin was director of the Louisiana State University Engineering Experiment Station prior to coming to ATA. As director, he coordinated all research activities for the engineering faculty of LSU. He edited and published research bulletins, papers and reports of the engineering department, and was in charge of the engineering extension service. In this latter capacity he directed short courses and conferences having to do with highway engineering and traffic safety.

Earlier he served as associate professor of civil engineering at LSU. An Army Reserve Lieutenant Colonel, he is an engineering graduate of LSU and was at one time traffic and planning engineer for the Louisiana Highway Department. He completed the Yale Bureau course in 1941.

Promotions

Ellis L. Mathes to Planning and Traffic Engineer, Idaho Department of Highways.

* * *

Robert A. Mitchell, to Acting Chief Engineer, City of Wilmington, Delaware.

* * *

Alfred L. Himelhoch, to District Engineer-Operations, California Division of Highways.

Strictly Business

Ramp Consulting Services Set Up As Independent Unit

Ramp Buildings Corporation has announced that their former consulting division has been incorporated under a new name, Ramp Consulting Services.

The new operation will continue to provide traffic and parking consulting service to municipal and private clients. For the present at least the new firm will continue to be housed with Ramp Buildings at 230 Park Avenue, New York City.

Principal officers of the new firm are Fred W. Moe, President; Jack W. Hart, vice president; and Gerald R. Lucas.

Wayne County to Use Traffic Control By Motorola

Wayne County, Michigan, will employ the country's first radio controlled traffic signal system to operate in the uncrowded 960 mc. microwave band, according to an announcement by Motorola, Inc., Chicago.

Successful bidder for the $15,500 Wayne County contract, Motorola will furnish a master traffic control transmitter unit and responsive control receiver equipment at eight intersections along the County road system in the Detroit suburban area.

Wayne County's Road Commission, anticipating responsibility for an ever-increasing number of roadway sections, is investigating radio control as possibly the most economical means of traffic signal control. The present synchronous control of the eight-signal section will be changed to radio operation for progressive traffic control and expediting purposes.

The transmitter and programming equipment will be remotely located, approximately eight miles from the controlled traffic signal intersections. The installation is designed to be easily expandable in area and in functions to meet presently anticipated needs.

Flex-O-Lite Introduces New Bead for Sign Use

Flex-O-Lite Manufacturing Corporation, St. Louis, has introduced its new #831 improved reflective glass bead for application to traffic signs, street name signs and license plates.

Developed after exhaustive research and engineering, the improved glass bead now makes possible white and yellow signs with reflectivity and message legibility never before obtainable at any price, the manufacturer asserts. Applied at economical cost by conventional methods and "permanized" with Flex-O-Lite's amazing new STORMCOTE protective covering agent, signs are weather, water, dirt and wear resistant, providing day and night reflectivity, coupled with low cost. Complete angularity of the new #831 bead assures full legibility up to the point of passing. Surface glare is avoided without "dead" spots. Arresting white and yellow signs take on a new dimension in luminous 'round-the-clock reflectivity. Marked dirt repellence and ability to withstand industrial fumes and atmospheric conditions, further assured by the STORMCOTE barrier, contributes to long life and full effectiveness.

Available in all standard sizes for application to traffic signs, the new #831 Bead is also manufactured in "extra-fine" grade for street name signs and license plates.

The complete #831 Reflective Sign System, combining beads, binder and STORMCOTE surface protection, in ready-to-use, kit form, insures the utmost in dependable reflectorization, reports the manufacturer. Full details are available upon request. Address the Flex-O-Lite Manufacturing Corporation, 8301 Flex-O-Lite Drive, P. O. Box 3066 (Affton Branch) St. Louis 23, Missouri.

Automatic Switching For Street Lighting Now Available

A new electro-mechanical control for automatic switching of street lighting circuits has been announced by G. W. Copeland, president of Tuttle & Bailey, division of Allied Thermal Corp.

The control, designated the Synchro Switch, does not utilize tubes, transistors, or a magnetic load relay in its circuit. By eliminating these components, the Synchro Switch also eliminates heating and "drift" problems, caused by amplification losses and tube aging.

Tubes and transistors are replaced in the new Synchro Switch by a cadmium selenide photocell which senses any change in surrounding light conditions. The unit also incorporates a synchronous motor and a high-capacity, snap-action switch which turns the street light on or off, depending on light conditions. The system is protected against transient light, such as lightning and automobile lights, by an integral time delay.

The control has a range of adjustment from .5 to 8 footcandles. One of its unique features is that both the turn-on and turn-off points can be easily and accurately adjusted. Load rating of the control is 1200 watts at 120 or 240 volts. Units are also available for 25-cycle operation.

The control is totally enclosed in a plug-in type casing which is interchangeable with existing mountings. A pole- or cross-arm-mounting is also available.

For complete catalog information, write: Tuttle & Bailey, division of Allied Thermal Corp., New Britain, Conn. Cat. No. 405.

New Rapid Transit Cars Ordered by Boston Transit Authority

The Metropolitan Transit Authority of Boston, in a continuing modernization move, has purchased an additional 50 light-weight rapid transit cars to be equipped with more than $800,000 worth of a new type of high performance propulsion equipment developed by General Electric.

The electric drive motors, to be built by the Company's Locomotive and Car Equipment Department in Erie, Pa. will pack nearly twice the horsepower in the same size frame as earlier models, and acceleration time to reach 40 mph will be cut nearly in half.

Although curves and drawbridges along the route make it necessary to maintain the speed limit of 40 miles per hour, the increased acceleration allows the operator more leeway in keeping on schedule.

The cars, to be built by Pullman-Standard, at its Worcester plant will seat 48 passengers each and up to six cars will be coupled together to form a train.

The new equipment will be assigned to the Forest Hills-Everett Route, which operates over an elevated structure through the highly urbanized areas of Boston, except for a short section of subway in the downtown area.

It will take 200 motors and 50 MCM control units to power the 50 cars. The motive power being replaced is over 40 years old.

Delivery of the new cars will begin February, 1958.

The Metropolitan Transit Authority pioneered the use of control systems similar to that being used on the new cars, on a fleet of 50 PCC cars put in service in 1951.

Last fall the Transit Authority ordered 50 cars similar to those in the new order.

The MTA reports the new cars are "much smoother" in operation because of the new propulsion equipment, and provide a more comfortable ride because of a new type of air springing.

Wider spacing between seats has cut down on the amount of time required for passengers to board and get off the new cars.

the NEW
F-2C FLASHER
outlives 'em all and costs less
Designed for high speed flashing of traffic signal lamps, the F-2C is an electronically controlled relay designed to pulsate the red light to provide greater target value and prohibit sun phanthom. Its flashing rate may be varied from 0 to 200 cycles per minute. As adjusted at the factory the contact dwell time is 50% with a flashing rate of 180 cycles per minute.
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New Publications

Urban Motorways.

British Road Federation, 26 Manchester Square, London W1, England. September 1957. 242 pp. and index. 55 shillings.

In 1956 the British Road Federation organized an International Highway Conference, usually referred to as the "London Conference." This volume is a report of that meeting, at which more than 500 delegates from 33 countries met to discuss urban freeways—called "motorways" in England.

A partial list of principal papers includes:

Urban Motorways in Great Britain, by Director of Road Research, D.S.I.R. and Mr. J. F. A. Baker, Chief Engineer (Highways), Ministry of Transport.

The Need for Urban Motorways, by Ing. M. le C. de Bussy, Director of Roads, Netherlands Government.

A Realist's Approach to the Traffic Problem, by Robert Moses, Chairman of the Consolidated Triborough Bridge and New York Tunnel Authority.

The Economic Justification for Urban Motorways, by Arthur S. Hodgkiss, Asst. General Manager, of the Triborough Bridge and Tunnel Authority, New York.

Some Design Aspects of Urban Motorways, by Dr. Max-Erich Feuchtinger, Consulting Traffic Engineer, Ulm, Germany.

Urban Motorways in Western Germany, by Professor J. W. Korte, Aachen Technical University and Dr. Ing. P. A. Macke.

Urban Motorway Development in the United States, by Joseph Barnett, Assistant Deputy Commissioner, Bureau of Public Roads.

Freeways in the Los Angeles Metropolitan Area by Lloyd M. Braff, General Manager, Department of Traffic, City of Los Angeles.

The Concept of Controlled Access by Harmer E. Davis, University of California.

Proceedings of the 43rd Annual Road School.

Engineering Bulletin, Extension Series 92, Purdue University, Lafayette, Indiana. April 1957. 219 pp. Free.

This publication contains papers presented at the 43rd annual conference of highway people at Purdue University. Of principal interest to traffic people will be papers on "Highways and the City," by Joseph G. Hazen of *Architectural Forum*; "What Can Be Done to Train the Traffic Engineer," by D. S. Berry, now of Northwestern University; "Adequate Traffic Engineering Organization," by C. C. Robinson of the Automotive Safety Foundation; and "Traffic Engineering by Non-Traffic Engineers," by J. C. McMonagle of Michigan State University.

International Traffic Engineering Vocabulary.

World Touring and Automobile Organization, 32 Chesham Place, London, S. W. 1, England 1957. Looseleaf. 40 shillings.

The Vocabulary has been prepared jointly by the World Touring and Automobile Organization (OTA) and the Permanent International Association of Road Congresses (PIARC) and is published with assistance from UNESCO.

It contains a total of some 300 concepts (or terms) used in traffic engineering, together with definitions and equivalents in six languages, viz. German, Spanish, English, French, Italian and Dutch. Some of the concepts are illustrated.

The Vocabulary is divided into three sections (the roadway, traffic control devices, traffic and traffic operations) each of which is further divided into sub-sections.

There is an alphabetical index in each language giving a reference number for each concept (or term) which makes it easy to find a term in any of the six languages.

The Vocabulary has been presented in loose-leaf format so as to permit the future insertion (within each section) of such new concepts as may appear useful.

A Policy on Arterial Highways in Urban Areas.

American Association of State Highway Officials, 917 National Press Bldg., Washington, D. C. 1957. 546 pp. and index. $5.00.

This publication is the work of the Committee on Planning and Design Policies of the Association. It is in effect a companion piece to the publication, "A Policy on Geometric Design of Rural Highways," prepared by the Committee in 1954.

Chapter headings include:

Arterial Highways and Their Location.
Design Controls and Criteria.
General Design Elements.
Major Streets.
At-Grade Expressways.
Depressed Freeways.
Elevated Freeways.
Combination-Type Arterial Highways.
Interchanges.

A first chapter summarizes principal policy points from succeeding chapters and thus becomes a quick reference for those familiar in general with the total publication. Numerous tables and illustrations add to the value of the book.

Investigating and Forecasting Traffic Accidents.

Bulletin 161, Highway Research Board, 2101 Constitution Ave., Washington 6, D. C. August 1957. 54 pp. $1.20.

This bulletin contains five papers presented at the 36th Annual Meeting, Highway Research Board, January 1957, under the auspices of either the Committee on Highway Safety Research or the Committee on Road User Characteristics. The papers are as follows:

"Indexes of Motor Vehicle Accident Likelihood," by J. H. Mathewson and R. Brenner.

"Driver Obedience to Stop and Slow Signs," by William T. Jackson.

"Driver Behavior and Highway Conditions as Causes of Winter Accidents," by Theodore W. Forbes and Milton S. Katz.

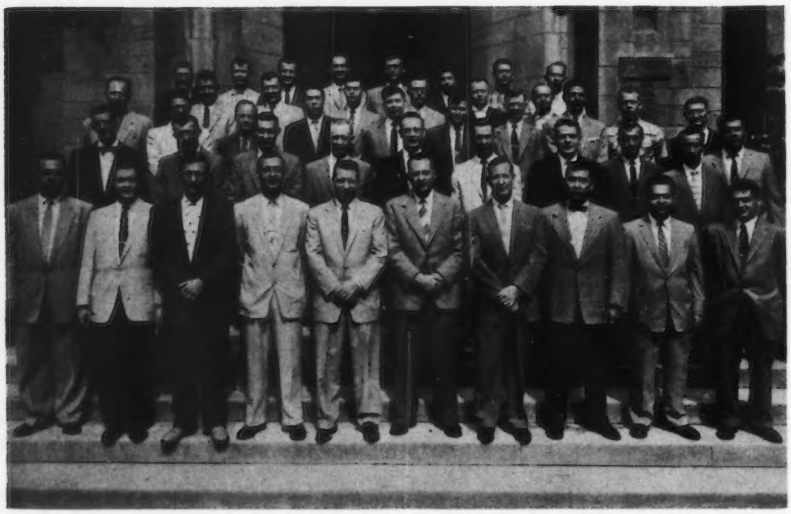
"A Method of Investigating Highway Traffic Accidents," by Thomas G. Brittenham, David M. Glancy, and Emmett H. Karrer.

"Predicting Accident Trends and Traffic Improvement," by Clifford O. Swanson and A. R. Lauer.

CORRECTION

In the article by Harold Marks entitled "Child Pedestrian Safety: A Realistic Approach" in the October issue, on page 14, there appears an error which should be noted. In the first sentence following the sub-heading in the left column, the statement should be: "It is very significant that only *7 per cent . . .*," not 75 per cent as it now reads.

Institute Affairs



First Row: Dunivan, Schofer, Heglund, Cochran, Coleman (Robert), Guerin, Wilson, Wong, Mancini, Gruenbaum. Second Row: Wenger, Ramsey, Keller, May, Walker, Squires, Herrington, Gerdes, Navaratana, Drummond. Third Row: Gailinas, Brown, Johinke, Sosslau, Salazar, Shebesta, Grant, Benites, Parker (Roy), Dodge. Fourth Row: Strombom, Burnham, Barnes, Raus, Coleman (Francis), Olshesky. Fifth Row: Hooper, Hixon, Goodman, Gramling, Decker, Weisstuch, Parker (Robbie), Ryan.

Yale Bureau Class Organizes Student Chapter

The 1957-58 class at the Yale Bureau has formed a Student Chapter with 34 members, as follows:

Barnes, Charles F. Jr. — Highway Engineer Intern, Connecticut Highway Dept.; Benites, Leopoldo — Assistant Chief Engineer, State Highway Dept., Comite de Vialidad del Guayas, Guayaquil, Ecuador; Brown, Richard C. — Highway Engineer Trainee, Virginia Dept. of Highways; Burnham, Archie C., Jr. — Junior Highway Engineer, Georgia Highway Dept.

Cochran, George A. — Professional Engineer I, Traffic and Planning Section, Louisiana Dept. of Highways; Coleman, Francis — Junior Highway Engineer, Connecticut Highway Dept.; Coleman, Robert R.—Traffic Engineer, Pennsylvania Dept. of Highways.

Decker, James DeWitt — Highway Engineer Trainee, Virginia Dept. of Highways; Dodge, Robert J. — Associate Traffic Engineer, Traffic Engineering Dept., North Carolina Highway Commission; Drummond, Robert F.—Senior Civil Engineering Draftsman, Boston Traffic Commission; Dunivan, Robert E.—Acting Division Traffic Engineer, Ohio Dept. of Highways.

Gailinas, Paul P.—Traffic Engineer, Bruce Campbell & Associates, Boston; Gerdes, Charles M. — Engineer-in-Training, Glace & Glace, Inc., Consulting Engineers, Harrisburg, Pa.; Goodman, Leon—Traffic Engineer I, Traffic Engineering Division, Port of New York Authority; Gramling, Bruce M. —Assistant Civil Engineer, New York City Dept. of Traffic; Grant, George—Assistant Engineer, Planning Branch, City Engineer's Dept., Johannesburg, South Africa; Gruenbaum, Michael — Civil Engineer, Illinois Div. of Highways; Guerin, Neil Stanley—Shire Engineer, Shire of Kerang, Victoria, Australia.

Heglund, Carl Tolbert—County Engineer, Montcalm County Road Commission, Stanton, Michigan; Herrington, Charles G., Jr. — Civil Engineer, Ohio Dept. of Highways; Hixon, Chas. D.—Oklahoma City, Okla.; Hooper, Paul C.—Junior Civil Engineer, Div. of Industrial Research, Washington State College.

Johinke, A. Keith—Traffic Engineer, Highways and Local Government Department, Adelaide, South Australia.

Keller, Olivier A.—Civil Engineer, Ebasco Services, New York City.

Mancini, Rocco A.—Civil Engineer, Edwards, Kelcey & Beck, Boston; May, John F.—Civil Engineer, Illinois Division of Highways.

Navaratana, Prasert—Assistant Engineer of Building Control Section, City Planning Section, Dept. of Public Works, Bangkok, Thailand.

Olshesky, John J.—Senior Highway Engineer (Design), Connecticut Highway Dept.

Parker, Robbie W.—Traffic Engineer Trainee, Arkansas Highway Department; Parker, Roy A. — Traffic Engineering Aide, Amarillo, Texas.

Ramsey, William A. — Wilmington, Delaware; Raus, Juri—Junior Highway Engineer, Connecticut Highway Department; Ryan, James E.—Assistant to the Traffic and Planning Consultant, Charles A. Maguire & Associates, Providence, Rhode Island.

Salazar-Aguilar, Sergio—Civil Engineer, Ministry of Communications and Public Works, Mexico City, Mexico; Schofer, Ralph E.—Engineer in Training, Ohio Department of Highways; Shebesta, Harvey—District Traffic Engineer, Wisconsin Highway Commission; Sosslau, Arthur B.—Civil Engineering Draftsman, New York City Dept. of Traffic; Squires, David Lee—Roadway Design Engineer, North Carolina Highway Commission; Strombom, Donald A.—Junior Civil Engineer, Division of Industrial Research, Washington State College.

Walker, Esper L.—Road Designer, Texas Highway Department; Weisstuch, Donald N. — Junior Civil Engineer, New York City Department of Traffic; Wenger, Deane M. — Junior Traffic Engineer, St. Paul, Minnesota; Wilson, Robert A. — Traffic Manager, Planning Div., West Virginia Road Commission; Wong Oliver Kee—Civil Engineer, Territorial Highway Department, Honolulu, Hawaii.

Havenner Nominates ITE Representatives to Public Officials' Confab

The Institute of Traffic Engineers, as one of some 30 organizations participating in the Public Officials Conference in Washington December 9 and 10 has nominated a group of members, all public officials, to attend. President Havenner named them in a letter to the President's Committee for Traffic Safety as follows:

Henry A. Barnes
Harold G. Bauerle
Karl A. Bevins
Lloyd M. Braff
Martin E. Bruening
Robert A. Burch
Mason A. Butcher
Roger T. Chandler
M. A. Conner
F. B. Crandall
James E. P. Darrell

Harold G. Eckhardt
George J. Fisher
Michael J. Gittens
George W. Howie
Kenneth M. King
E. E. Lewarch
Alger F. Malo
William R. Marston
Ellis L. Mathes
J. P. Mills, Jr.
Robert A. Mitchell
Earle W. Osterhoudt
Ross T. Shoaf
Joseph L. Wehmeyer
Edward G. Wetzel
T. T. Wiley

These members will attend the two-day meeting in Washington to develop a statement of the current status of traffic safety and propose a series of statements of needs, with particular emphasis on those for which public support is needed.

The Conference itself will include seven workshops, on subjects of engineering, education, police enforcement, laws and ordinances, courts, motor vehicle administration, and official coordination and inter-governmental cooperation. The Institute is one of six groups chiefly interested in the engineering workshop. Chairman of this workshop is C. R. MacMillan, president of AASHO, and vice-chairman is George W. Howie, ITE representative.

Results of the Conference will form the basis for discussion at four regional public support conferences scheduled for 1958, as shown below.

Chicago — April 1 and 2
San Francisco — April 8 and 9
Atlantic City — April 15 and 16
Miami Beach — May 29 and 30

Purdue Student Chapter Organized for 1957-58

The Purdue Student Chapter has been organized under the sponsorship of Professor Harold F. Michael. Student members are:

Lawrence D. Powers
Harlan H. Blindauer
B. R. Bradley
Donald O. Covault
Neddy Jouzy
A. D. O. P. Saparamade
Douglas J. Hamilton
John Feyereisen
Thomas Keith Dellaway
M. R. Malya
B. D. Mathur
Herbert Koestenberger

(Continued on page 36)

New Membership Requirements Approved

New membership requirements contained in proposed changes in the Constitution and By-laws were approved by voting members in a mail ballot just tallied. Tellers William F. Boardman and John H. Mitton, appointed by President Havenner, reported the changes were approved by an overwhelming majority.

The newly-adopted sections are printed below in full:

CONSTITUTION

Article II, Section 1

The membership of the Institute shall consist of Members, Associate Members, Junior Members, Honorary Members and Affiliates. A member of the Institute shall be an engineer or a person similarly qualified.

Article II, Section 2

Members and Associate Members shall be equally entitled to all the privileges of the Institute excepting that Members only shall be eligible to hold elective office. Honorary Members, Junior Members and Affiliates shall enjoy all the privileges of membership except the right to vote and to hold elective office. Any person elected an Honorary Member, who at the time of election was a Member or Associate Member of the Institute, is entitled, if he so elects, to retain such membership status with all the privileges and obligations pertaining thereto.

BY-LAWS

Article I, Section 1

A member, at the time of his admission, shall be not less than 35 years of age and shall have been in the active practice of engineering for at least 12 years and shall have had responsible charge of important work for at least 5 years. For at least 5 years he shall have been in the active practice of traffic engineering and shall have had responsible charge of important traffic engineering work for at least 3 years, and shall be qualified not only to direct but to conceive and design traffic engineering work.

Article I, Section 2

An Associate Member, at the time of his admission, shall be not less than 27 years of age and shall have been in the active practice of engineering for at least 8 years. For at least 3 years he shall have been in the active practice of traffic engineering and shall have had responsible charge of professional work in traffic engineering for at least 1 year and shall be qualified to direct traffic engineering work.

Article I, Section 3

A Junior Member, at the time of his admission, shall be not less than 21 years of age and shall have been in the active practice of engineering for at least 4 years or he shall have been graduated in engineering from a school of recognized standing. In addition he shall have had active practice in traffic engineering for at least 1 year. His connection with the Institute shall cease when he becomes 35 years of age unless he be previously transferred to a higher grade. No applicant will be admitted to Junior Membership whose total years of active professional work at age of date of application is such that it will be impossible for the applicant to meet the total years of active professional work and responsible charge required for Associate Membership when the applicant would become 35 years of age.

Article I, Section 4

Any person having necessary qualifications prescribed in these articles to entitle him to admission to the Institute as a member, shall be eligible for such membership, though he may not be practicing engineering at the time of his application.

Article I, Section 5

No change.

Article I, Section 6

An Affiliate, at the time of admission, shall be a person who, by scientific achievement or practical experience, has attained a position in his special pursuit qualifying him to cooperate with traffic engineers in the advancement of professional knowledge and practice, but who is not a professional traffic engineer. An affiliate, at the time of his admission, shall have had responsible charge of important work for at least 5 years, and shall have been engaged in his special pursuit for at least 12 years and shall not be less than 35 years of age. At no time shall an invitation be extended to become an Affiliate if number of Affiliates equals or exceeds 10 per cent of the total number of Members and Associate Members.

Article I, Section 7

(Revised as Article I, Section 10)

Article I, Section 7 (New Material)

In determining the total time of active practice of engineering, the total period of practice shall be divided into two general classes, sub-professional work and professional work. Each year of sub-professional work shall be rated as equivalent to one-half year of professional work, but not more than 8 years of sub-professional work shall be counted in determining the total time of active practice of engineering. During the period of professional work, information submitted as to the years and character of responsible charge of work shall indicate clearly that part which is of the standard required for Associate Member and that part required for Member.

Article I, Section 8
(Delete entire Section)

Article I, Section 8 (New Material)

Sub-professional work shall cover the time spent as rodman, chainman, recorder, draftsman, instrumentman, inspector, investigator, or as crewman in the collection and summary of traffic survey data or in the installation and maintenance of traffic control devices, or in similar grades of work where the applicant is working under direct supervision or on work where the personal responsibility and technical knowledge required are limited. It shall also include time during which the applicant has been engaged in engineering work before he is 21 years old, except as modified by the statement in regard to education in Section 10 of this Article.

Article I, Section 9
(Delete entire section)

Article I, Section 9 (New Material)

Professional work shall include the time after the applicant is 21 years old, during which he has been engaged in engineering work of a higher grade and responsibility than that above defined as sub-professional work. Time spent in engineering teaching in a school of recognized standing subsequent to graduation shall be counted as professional work.

Article I, Section 10

In considering the qualifications of candidates for the grade of Member, Associate Member, and Junior Member, graduation in engineering from a school of recognized standing shall be equivalent to 4 years of active practice in engineering, and the satisfactory completion of each year of work in an engineering school of recognized standing without graduation shall be equivalent to one-half year of active practice. Graduation in a course other than engineering from a college or university of recognized standing shall be considered equivalent to 2 years of active practice, providing that such a course contained substantial credits in mathematics, physics, economics, statistics and similar subjects of benefit to the applicant in the practice of engineering. No candidate shall receive credit for more than 4 years of active practice in engineering because of education qualifications; except that this limitation shall not apply to graduate study in engineering, when the time actually spent in graduate study following an engineering degree shall be considered as equivalent to the same amount of active engineering practice, but as such shall not count as responsible charge.

Article I, Section 11

Responsible charge of work of the standard required for admission to the grade of Associate Member means definite responsibility for professional work of substantial importance:

a. In the field, the applicant must have had the responsibility for the direction of work, the successful accomplishment of which rested upon him, where he had to decide questions of methods of execution and suitability of materials, without relying upon advice or instructions from his superior, and of supplying deficiencies in plans or correcting errors in design, surveys and operations without first referring them to higher authority for approval, except in cases where such approval is a mere matter of form.
b. In the office, the applicant must have had to undertake investigations, or carry out important assignments, demanding resourcefulness and originality, or to make plans, write specifications and direct the drafting and computations for designs of engineering work, with only rough sketches, general information and field measurements for reference and guidance.
c. In engineering teaching, the applicant must have taught in an engineering school of recognized standing, and must have had at least a grade of Assistant Professor or equivalent, or he must have been engaged in engineering research of substantial importance.

Article I, Section 12

Responsible Charge of Work of the standard required for admission to the grade of Member means broad responsibility for professional work of major importance;

a. In the field or office, the duties and responsibilities of the applicant must have been definitely above those required for the grade of Associate Member. The applicant must have had full responsibility for the conception, design and direction of major engineering work.
b. In engineering teaching, the applicant must have taught in an engineering school of recognized standing, and must have had at least a grade of Associate Professor or its equivalent, or he must have been engaged in or had broad responsibility for engineering research of major importance.

Article I, Section 13

Membership in one of the Founder Engineering Societies shall be accepted as proof of the necessary engineering experience, other than traffic engineering experience, required for admission to the equivalent grade in the Institute, and registration as a Professional Engineer shall be accepted as proof of the necessary engineering experience, other than traffic engineering experience, required for admission to the grades of Member and Associate Member in the Institute.

Article II, Section 1

An applicant for admission to the grade of Member, Associate Member, or Junior Member, or for transfer from one grade to another, shall submit a detailed statement of his professional training and experience in such form and detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain an agreement to conform to all the requirements of the Institute, if elected. Each applicant applying for admission or transfer to the grade of Member or Associate Member shall furnish with his application the name of five members of the Institute to whom he is personally known and who hold membership in a grade at least equal to that

for which the applicant is applying. An applicant applying for the grade of Junior Membership may furnish the names of five persons to whom he is personally known, at least two of whom shall be members of the Institute and the remainder shall be members of the Founder Engineering Societies or other persons of recognized engineering reputation. If the applicant, applying for admission to any grade, resides outside the United States, he may furnish the names of five members of accredited engineering societies of the country in which he resides, and to whom he is personally known.

Article II, Section 3

Affiliates shall be selected by invitation of the Board of Direction. Any voting member of the Institute may nominate a qualified candidate for Affiliate. Nominations shall be made in writing to the Executive Secretary of the Institute on such forms and in such detail as may be prescribed by the Board. The Board of Direction shall consider all such nominations and carefully examine the individual's record. At least 6 affirmative ballots must be cast to extend an invitation to become an Affiliate. Acceptance of such an invitation shall then constitute an election.

Article III, Section 2 (New Material)

The Board of Direction may, in its discretion, place a member or Affiliate in an inactive status, relieving him of the normal dues obligations. A member or Affiliate in such inactive status shall not have any vested right to privileges available to other Institute members and may be restored to active status only upon re-application and evidence that such restoration would be in the best interests of the Institute.

Article III, Section 2
(Renumber as Section 3)

Article III, Section 3
(Renumber as Section 4)

Nominating Committee Appointed by President Havenner

A Nominating Committee has been appointed by President Havenner, acting on authority of the Board of Direction. Named as chairman was Harry Porter, Jr., of Chicago. T. T. Wiley of New York was named member-at-large. The other members were selected to represent the three Districts which will elect Directors in 1958. Those named were:

District 3—Joseph L. Wehmeyer, Detroit

District 5—Walter H. Klapproth, Austin

District 6—F. B. Crandall, Salem

Section News

Section Meetings

MIDWEST:

Monthly meetings, third Thursday, except January, July, August and October. Contact: A. L. Forde, RAndolph 6-8000.

NEW YORK METROPOLITAN:

Feb. 6, March 20 (Ladies Night), April 17, May 22. Contact: Gordon K. Gravelle, 100 Gold St., DIgby 9-0090 for place and time.

NEW ENGLAND:

In conjunction with Massachusetts Safety Council, Boston, on March 17. Contact: M. J. Huber, Yale Bureau of Highway Traffic, New Haven, Conn.

SOUTHERN:

Next meeting in Memphis, Tenn., during Southern Safety Conference, March 2, 3 and 4, 1958.

TEXAS:

Fifth Annual Meeting, January 25, Roosevelt Hotel, Waco. Contact: R. T. Gregory, City Hall, Waco.

WASHINGTON (D.C.):

Annual HRB Dinner Meeting, January 7, Shoreham Hotel, Washington, D. C., Contact: Mason Butcher, Director of Public Works, Montgomery Co., Rockville, Md.

WESTERN:

Oregon Area —

Dinner meeting during Northwest TE Conference, January 22-24, Corvallis. Contact: J. Al Head, Salem 4-2171, Ext. 210.

Los Angeles Area —

Joint Meeting with ITTE, UCLA, Hollywood Roosevelt Hotel, January 30, 6:30 p.m. Contact: S. S. Taylor, City of L. A.

MID-ATLANTIC SECTION

Meeting Notes

The fourth meeting of the Mid-Atlantic Section was held in Pittsburgh on Friday, September 6, 1957 at the Gateway Restaurant, with President *Michael J. Gittens* presiding.

Officially, 31 members and 16 guests attended the dinner with a total of 55 members and guests in attendance for the meeting.

A demonstration of a closed television circuit was held, which demonstration worked out very well. We had a bright, clear day and an automobile accident in the Point Area caused a traffic tie-up which was interesting to observe. The members were impressed by the possibility of using television for observing traffic conditions. Bob Holmes arranged for a showing of a movie illustrating the construction of "The Cantilever Bridge" which is the Tappan-Lee Bridge crossing the Hudson River at Nyack, New York; and Mr. M. D. Corner of the American Bridge Division of the United States Steel Corporation gave a short discussion on bridge building.

Personal News

R. R. Coleman, Traffic Engineer of the Pennsylvania Department of Highways, has taken a leave-of-absence for one year to attend the Yale University School of Traffic Engineering. Bob reports he and his family are all doing well and enjoying the experience.

J. H. Comiskey, Jr., former Safety Engineer for the Pennsylvania Department of Highways has taken over the duties as Traffic Engineer during Mr. Coleman's absence.

Clark McClellan of the PMF is enjoying a week's vacation touring New York and Connecticut.

Ray Cox, Traffic Engineer of the Williamsport office of the Pennsylvania Department of Highways is taking a couple weeks off to visit his son at Jacksonville, Florida and to get in some fishing and sun bathing.

Joseph Daley of the Erie office of the Pennsylvania Department of Highways, Traffic Unit, is expected to be back in harness after serving a hitch in the Army at Camp Gordon.

O. J. Reichelderfer, Jr. reports he had a pleasant visit with our friends in the New Jersey Highway Department discussing mutual problems.

We are glad to report that *J. G. Jones* of the Indiana office of the Pennsylvania Department of Highways is back at work after a couple of fast rounds in the hospital.

We have learned that *Bob Mitchell* was appointed Acting Chief Engineer of the City of Wilmington on October 9 by the Directors of the Street and Sewer Department. It is hoped that in a very short time Bob will be officially appointed Chief Engineer to take over the duties of Edward F. Koester formerly Chief Engineer, who retired October 1. In this new job, Bob will still have the responsibility for the work of the Traffic Engineering Division.

It has been reported that *Bill Miller* of Delaware is still concentrating most of his time on promoting the plans for the several freeways to be built in Delaware under the Interstate Highway Program.

It appears as though the membership of Philadelphia were quite pleased that many of their members were seen in good company in Detroit at the Convention, while others became Public Works officials for the week at the American Public Works Association meeting in Philadelphia.

One of our mighty hunters (*Walt Carper* of the Planning Division of the Pennsylvania Department of Highways) is having a little trouble. May we solicit help from the membership—he missed his deer via bow and arrow and his turkey via shotgun. We will shed no tears as he managed to walk away with top prize, portable TV, from the Pennsylvania Constructors Picnic.

Dave Witheford, Tony Miscimarra and Little Rock *Hudspeth* had a lot of fun at the Annual Banquet with some of the Detroit Section members. In fact, we were all converted southerners when the band played Dixie.

Bill Froehlich of Pittsburgh and *Nils Rosen* of Sweden seemed to have a lot in

common when they started to compare ancestors. You should hear Bill murder the language.

MIDWEST SECTION

—Elizabeth McLean, Publications Chairman

Burton Marsh of the Automobile Association of America was the guest speaker at the October Midwest Section meeting. On the subject of metropolitan problems, Mr. Marsh said that a 50 per cent increase in traffic is predicted by 1975. This is due to the fact that the majority of U. S. growth occurs in metropolitan areas. Coordinated action is necessary to achieve a workable solution to the problems created by this growth. Traffic engineers will be key men in seeking this solution and must be more energetic in assuming their role. Mr. Marsh concluded his remarks by saying that "traffic engineers should meet these bigger needs and attack these bigger jobs which offer the challenge of the future."

Charlie Prisk, immediate past president of the ITE and *Dave Baldwin*, secretary of the ITE, were among the 54 members and guests present at the meeting held at WSE.

NEW ENGLAND SECTION

The first meeting for the 1957-1958 season was held at the Yankee Silversmith Inn, Wallingford, Connecticut on October 23, 1957, with 52 members and guests present.

President Chandler announced the tentative schedule of meetings for the year as follows:

December 4—New Haven.
March 17—In conjunction with the Massachusetts Safety Council, Boston.
April meeting—Providence, R. I.
May meeting—Annual Business Meeting, Hartford.

Fred Hurd reviewed the action of the Board of Direction of the Institute during the annual convention in Detroit.

President Chandler informed those present of the refresher course for the professional engineering registration examination to be presented by the New Haven College.

A discussion concerning the participation of the New England section of the ITE in helping to prepare for the 1959 ITE annual convention to be held in New York City followed. Following the discussion, it was moved and seconded that the section offer its services to *Warren Quimby*, general chairman of the 1959 convention. The motion was carried.

Following the business meeting, the program was turned over to *Don Cleveland*, local arrangements chairman. Don introduced the guest speaker, *Gene Maier*, Director of the Department of Traffic and Transportation, Houston Texas, who is Chairman of the Committee on Recommended Standards for Street Services and Facilities of the National Committee on Urban Transportation. Gene discussed the activities of the National Committee and the relationship of Traffic Engineers to urban transportation problems.

WESTERN SECTION

—from the Newsletter,
Martin J. Bouman, Editor

Bay Area

Four new members have joined the roster of the Bay Area in recent months. They are *Charles J. Astrue*, Jr. (Associate), Senior Transportation Engineer, California Public Utilities Commission; *Robert L. Jaffe* (Associate), Traffic Engineer, City of Santa Clara; *William J. Dabel* (Junior), City Administrator, Benicia; and *Frank T. Shreve* (Junior), Assistant Traffic Engineer, Contra Costa County. *Jaffe* comes to us from Providence, R.I., by way of Evansville, Indiana, and *Dabel* who used to be in Napa has spent the last two years in North Sacramento. Welcome aboard. *Israel Gilboa* has transferred from Junior to Associate Member in the ITE.

There have been a number of promotions in the area. *Bob Graver* is now Assistant Manager of the Public Relations Department of C.S.A.A. *Norman Kennedy* has been appointed Professor of Transportation Engineering in addition to his other titles at I.T.T.E. *Wolf Homburger* is now an Assistant Research Engineer at I.T.T.E. *Charles Koch* has been promoted to Assistant Civil Engineer in *Ross Shoaf's* department in San Francisco.

The Santa Clara County Origin-Destination Survey is underway with *Jim Mayer* in charge. Magnificent traffic jams occurred during interviews of Bay Shore Highway.

Yield Streets (secondary through streets protected by Yield signs) are gaining popularity in Bay Cities. At least three local cities have such installations. Oakland has a number of these streets located in residential areas. Accident data for an 18 month period before and after installation show a reduction from 24 to 13 accidents on the street. Albany has two such streets with accidents being reduced from 20 to 10 after installation. Napa has five Yield streets (one of which was a through street) with reduction from 15 to 8 accidents.

San Francisco's "scramble" system which was installed in March 1954 on a trial basis will be removed next month on a trial basis. Arguments for and against the system have waxed hot and heavy in the last few weeks. *Ross Shoaf* is happy to see them go but there is considerable opposition to their removal.

Wolf Homburger is on a nation-wide tour gathering information concerning the use of buses on expressways. Cities he is visiting include Dallas, Atlanta, Washington, New York, Philadelphia, Detroit and Chicago.

San Joaquin Valley Area

The City of Modesto instituted on September 1 its first one-way street system involving two streets running in an east-west direction, and two streets running in a north-south direction through the central business district. Approximately five miles of streets were made one way.

In order to get the one-way streets in operation, eight new traffic signals were added, bringing the number of signals that have been installed this year to ten.

In process is the opening of two more lots which will bring the number of parking lots to 14 and the number of municipally controlled off-street parking spaces for the public to 800. This does not include any spaces around the City Hall, or around other public buildings of the City. These are strictly shopper and all-day parker spaces.

Inter-Mountain Area

Dale Hamilton of the Traffic Division has made application for membership in the Institute. Dale, an electrical engineering graduate of the University of Idaho is our Signal and Illumination Engineer. This brings the total number of ITE members in Idaho to five.

The Traffic Division is making a study of the P.R. System versus a series of volume density controllers for signal control on an improvement on U.S. Highway 30 through the City of Boise. This project also includes widening, installation of a 14 ft. median, channelization, and illumination.

Jack Shockey and *Jack Henberger* were among the recent visitors to Idaho. We wondered if it was coincidence or planned that fishing was especially good at the time of their visit.

Arizona-New Mexico Area

Chuck Haley reports that he has 85 empty paint buckets for sale; these buckets are unusully well qualified for use since they have endured much sarcasm, ridicule and other similar bouquets commonly referred to as Traffic Engineering experience. Chuck says he is tired of leaving for work a half-hour early in the morning so he intends to replace these durable veterans with that insidious medium of channelization known as concrete. In order to keep the garden groups happy, the channels will also include palm trees, flower gardens and underground sprinklers. Landing nets will be provided for the pedestrians whom scoffers see as the victims of this perilous venture.

Arnold Johnson, Chuck's worthy assistant, decided to buy a house instead of building with second-hand buckets. At last report he was attending the Indian Rain Dances in the hope of encouraging a lawn in his speck of the desert.

Charles Pemberton is quietly and secretly planning an assault on the Academy Awards this next year. His Traffic Safety Division is producing a number of short film strips in an effort to better acquaint the motorist with the need for heeding the traffic control devices.

Some of the titles include: "If you don't yield, you will land in left field"; "If you don't want to stop, please carry a mop"; "If you want to keep nifty, then don't exceed 50."

Shirt buttons were a dime a dozen near *Ray McCally's* desk for a while. He is now settled down to his usual routine of special investigations. In addition to the nocturnal burden of the new daughter, Ray is also carrying the analytic details of the BPR Section 117 Study which has to do with speeds and accidents.

John Carls and *Bill Ealey*, Tucson's tremendous two-some, are deep in the heart of studies relating to the ambitious capital improvement program under way in their City. Completion of this program will give the "Old Pueblo" a New Look.

No word from *John Kennedy* since Denver. If rumors are true however, one of Kennedy's biggest problems is going to be that of finding a replacement for *Bob Conradt*. The grapevine has it that Bob has forsaken the "Tacos of Taos" for "Pay by the Bay."

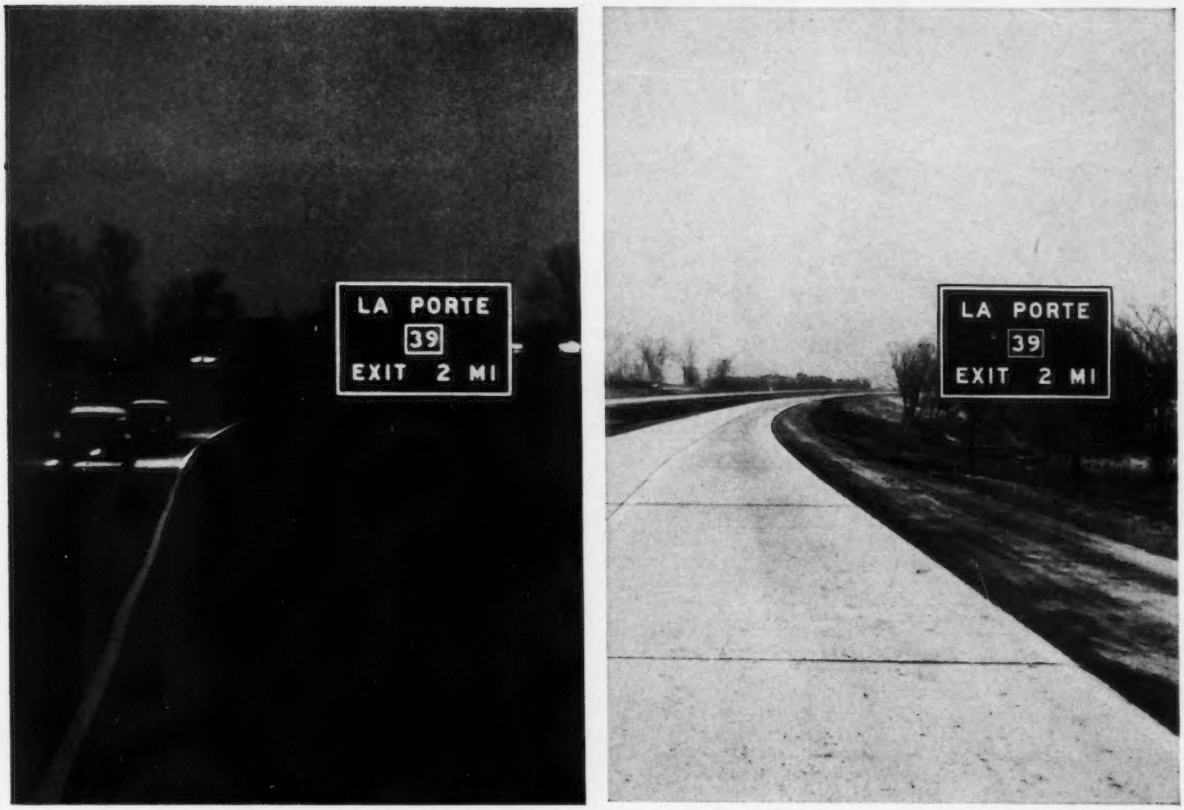
No word from *Frank Burton* lately; in fact, it is not known whether he got home from Denver; further, the last time seen in Denver, he appeared to be having too good a time to be thinking of Albuquerque. If anybody knows of his whereabouts, please call the Editor (not collect).

Los Angeles Area

On January 30, 1958, a joint dinner is planned at the Hollywood Roosevelt Hotel in conjunction with the annual road conference of the Institute of Transportation and Traffic Engineering of UCLA.

San Diego Area

"Lucky" Luckenbach reports that *Mel West*, a former District XI Traffic Engineer, stands #5 on the California Division of Highway's list for Principal Highway Engineer. Congratulations, Mel!! We hope



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AGA DIVISION

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that you are appointed soon . . . Lucky is busy heading a Metropolitan Freeway study. *Ed Hall's* Transportation Research group is cooperating with Lucky on the project.

Jim Reading took off for the Governor's Annual Safety Conference in Sacramento. He will be joined by *Paul Fowler* of San Diego County, and *Ed Hall*. Ed will report on *Activities of the National Committee on Urban Transportation and San Diego—a Pilot City* to the Engineering Division of the Safety Conference.

Don Robbins and *Keith Gilbert* were promoted to the grade of Associate Traffic Engineer effective October 1, 1957. Congrats to both!

Jim Reading's office reports that 165 Mercury Vapors were recently put in service in the Central Business District, completing Phase II of the street lighting modernization of the CBD. Phase III is now near completion, making a total 500 new Mercury Vapors for the district . . . The City's 1957-58 traffic signal and safety lighting budget, just approved, amounted to $562,700. This includes conversion to one way operation of the remaining CBD signals.

Steve George, of Transportation Research, is supervising a 162 mile travel time study involving cooperation of the California Division of Highways, County of San Diego, and the City of San Diego.

William Schempers, Jr. is the most recent addition to the City of San Diego Traffic Engineering staff. Bill came to San Diego immediately after graduating from the 1957 class of the Yale Bureau of Highway Traffic. He is a native of Massachusetts, having lived in both Quincy and Needham. After receiving his B.S. in Civil Engineering from Tufts University in 1953, Bill served in the Navy for 3 years on the attack transport, U.S.S. Noble. He presently holds a commission in the Naval Reserve as a Lieutenant Junior Grade. On August 17, 1957, Bill married Anna Mae Sheehan of Braintree, Massachusetts.

Positions Available

SALT LAKE CITY, UTAH

Position: Assistant Traffic Engineer. To assist City Traffic Engineer in established Traffic Engineering Department in all phases of Traffic Engineering work.

Requirements: Graduate engineer with two years' experience or advanced training in traffic engineering. Capable of supervising the planning and installation of traffic signs, signals and markings.

Salary: $500.00 to $600.00 per month with maximum salary obtainable through merit increases.

Apply: James W. Challis, City Traffic Engineer, Room 400 City and County Building, Salt Lake City, Utah.

MADISON, WISCONSIN

Position: Assistant Traffic Engineer.

Qualifications: Registered professional engineer to act as assistant traffic engineer in newly established department. U. S. citizenship necessary.

Salary: $657 to $767 per month.

Apply: Personnel Department, 404 City-County Bldg., Madison 9, Wisconsin.

Letters to the Editor

More on Over-Signing

Sir:

The sketch of over-signing which was shown in the October issue leads me to submit to you the enclosed photograph. Here is a most bewildering array of signs most of which are the property of civic organizations. Of the signs shown, four were placed by the City, six by civic organizations and three by the State Highway Dept.

As you might guess, this is a major approach to the City — near the City limits, and is a problem that is repeated on several other approaches. I wonder if others have found a solution to this.

WILLIAM R. MCGRATH, *Director Dept. of Traffic and Parking*
New Haven, Conn.
October 25, 1957

SPOKANE, WASHINGTON

Position: Traffic Engineer II.

Requirements: Engineering degree, electrical preferred but not mandatory; two years traffic engineering experience; should be qualified to supervise design of signals and other control devices.

Salary: Begin $6,240 increases to $7,500 in 5 annual increments.

Position: Traffic Engineer I.

Requirements: Engineering degree with courses or experience in traffic engineering field. Satisfactory traffic engineering experience may be accepted in lieu of degree.

Salary: Begin $5,568 increases to $6,720 in 5 annual increments.

Apply: H. F. Aumack, Director of Planning and Transportation, 451 City Hall, Spokane, Washington.

ORLANDO, FLORIDA

Position: Traffic Engineer to head separate department.

Requirements: State qualifications.

Salary: $6,000 to $7,000.

Apply: Office of the Mayor, Orlando, Fla.

PURDUE ORGANIZES

(Continued from page 31)

Sophocles Schortsanitis
J. P. A. D. Fernando
W. A. McLaughlin
R. L. Van Cleave

In addition, three members of last year's chapter are still in school: Paul Weckesser, Paul Cribbins and Suwarto Hardjodipuro.

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Letters to the Editor

Dear Dave:

The opportunity to write a few words is at hand. What with the Columbo plan meeting and the recent explosions we are sticking close to home, and besides our Vietnamese counterparts are very busy. A huge parade is scheduled for tomorrow to celebrate the second anniversary of the republic.

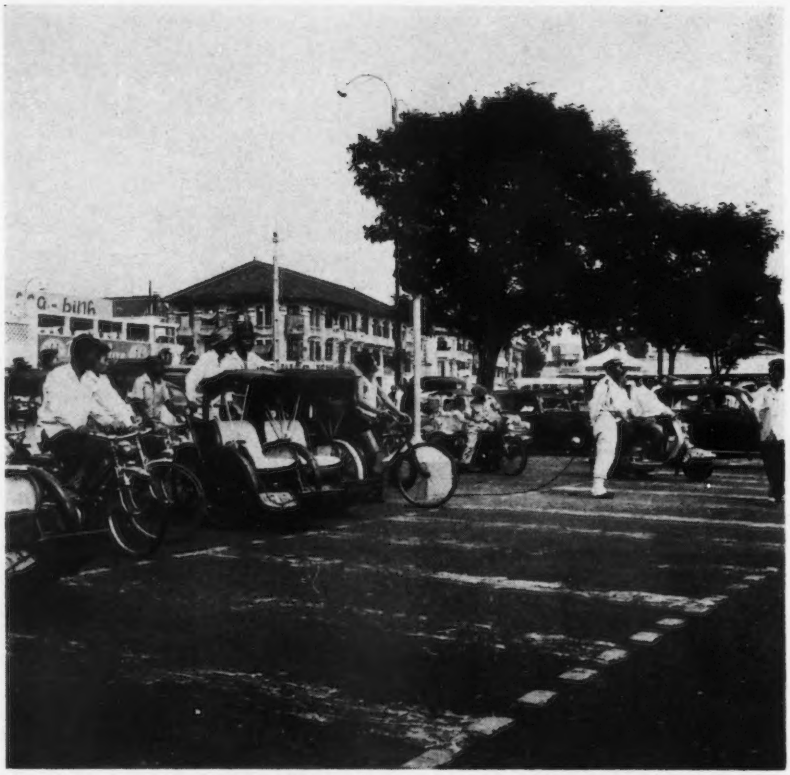
I hope you will be interested in the enclosed photos which are self-explanatory.

I try to keep in touch with the old gang but miss one now and then. By the way, what is Ted Siegel doing? He hasn't written. Don't forget, my wife just reminded me, if you get any good leads on jobs in Europe, keep us in mind. After all, I don't want my French lessons to go to waste.

Thanks again for your continued interest in our activities. By the way, would you also include the following after my name in the year book listing —Traffic Engineering Advisor, Vietnam Project, Michigan State University—it looks kind of bare now with only an address.

JEROME D. FRANKLIN
MSUG Box 34
Navy 150 FPO
San Francisco

October 25, 1957



View at the main circle in Saigon showing the many types of vehicles in use. Note the scooters, the cycle-pousses, the bicycles, etc. The portable signal was recently furnished through American-aid. Also note the "zebra-crossing" which is well used.

Another view of the circle in front of the Saigon market showing painted islands, crosswalk, a "pagoda" for the officer controlling traffic.

Pedestrian obedience in Saigon.

SPEED ZONES

(Continued from page 23)

A successful speed regulation program which is designed to reduce the number of deaths and injuries on our streets and highways, while still providing for rapid highway transportation, must be based on scientific methods for obtaining speed data and then utilizing this data in a scientific manner to arrive at a logical and reasonable speed limit.

The Institute of Traffic Engineers presently has a committee working on the development of warrants for speed zoning. These warrants might be used in somewhat the same manner as those found in various sections of the Manual for Uniform Traffic Control Devices. The warrants, as presently proposed, require knowledge of certain conditions such as design speed, minimum length of zone (if proposed zone is lower than adjacent zone), minimum distances between access points, and the frequency of roadside businesses per mile. Consideration is also given to such items as the upper and lower limits of the pace, the 85 percentile speed, the accident rate per million vehicle miles, and the results of test runs.

The successful development of these warrants and their subsquent application in the field will then eliminate the need for so-called tolerances by enforcement officials. The motorist may then have renewed confidence in the speed zoning signs and he would be able to assume that if the sign says 60 mile an hour that that is the maximum safe speed at which he may travel under the most favorable conditions; and if the sign says 20 miles per hour, the same is true.

A speed zoning program, if it is to be successful, must include the selection of numerical limits which will seem reasonable to the average careful motorist. These limits must be clearly and uniformly posted at frequent intervals.

The speed zoning program must be understood by the public. This understanding should be based on the premise that the limits are determined on the basis of facts obtained from an engineering investigation and not merely on opinions or political promises.

The relatively small percentage of drivers who exceed these "reasonable" limits must then be apprehended by an informed police force which has been assigned through a program of selective enforcement.

The speed violators must be brought before a court which also understands the basis of scientific speed zoning. The court must be legally qualified and willing to assume its part in this phase of the program to eliminate the bad drivers by either teaching them to become good drivers or restricting or suspending their driving privileges.

The Need for Continued Research and Education

Much more basic information concerning speed characteristics, driver attitudes towards speed, driver abilities relating to speed, the determination of minimum as well as maximum safe speeds, and so on, are necessary. More complete accident investigation data should be collected so that the present statement, "Speed is our No. 1 killer," which implies that high speed is a killer, but which actually means speed too fast for conditions is a killer, can become much clearer. There is a great deal to be learned before we can determine when certain roadway, vehicle, and human conditions can combine to create a critical speed condition.

Government officials must be taught to look upon speed measuring devices, like parking meters, as enforcement and engineering equipment and not as revenue equipment. Engineers must learn how to determine speed characteristics and to establish speed zones in a scientific manner. The police and the courts must learn and utilize the latest methods for apprehending and re-educating those drivers who drive at speeds which are unreasonably too fast or too slow. Last, but by no means least, the general public must learn that speed facts are being assembled and they must demand public officials who will utilize these facts.

Bibliography

1. Traffic Speed Study, State Highway Commission of Wisconsin, May, 1956.
2. *Comparison of Speeds on the Rural State Trunkline System Before and After Enactment of the 65-55 MPR Speed Law, April 1955-April 1956,* Michigan State Highway Department, May, 1956.
3. *Traffic Speed Trends,* Informational Memorandum, Bureau of Public Roads, 1956.
4. Lefeve, P. A., "Speed Habits Observed on a Rural Highway," Proceedings, Highway Research Board, 1954, pp. 409-428.
5. Lefeve, P. A., "Relation of Accidents to Speed Habits and Other Driver Characteristics," *Traffic Accidents and Violations,* Bulletin 120, Highway Research Board, 1956, pp. 6-30.
6. Lefeve, P. A., "Speed Characteristics on Vertical Curves," Proceedings, Highway Research Board, 1953, pp. 395-413.
7. Wiley, C. C., Matyas, C. A., and Henberger, J. C., "Effect of Speed Limit Signs on Vehicular Speeds," University of Illinois, 1949.
8. Matson, Theodore M., Wilbur S. Smith, and Frederick W. Hurd, *Traffic Engineering,* 1955, pp. 45-66.

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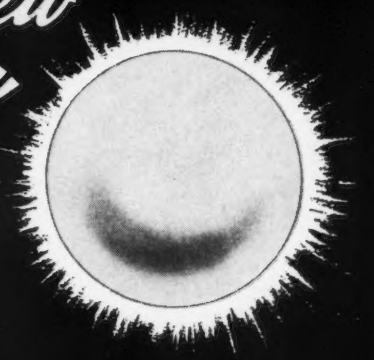

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Annual Meeting, Sheraton Park Hotel, Washington, D.C. Contact: HRB, 2101 Constitution Ave., Washington 25, D.C.

January 20-23 — AMERICAN ROAD BUILDERS ASSOCIATION—
Annual Convention, Sheraton Park Hotel, Washington, D.C. Contact: ARBA, 600 World Center Bldg., Washington 6, D.C.

February 24-28 — AMERICAN SOCIETY OF CIVIL ENGINEERS—
Convention, Sherman Hotel, Chicago, Ill. Contact: ASCE, 29 W. 39th St., N.Y.C.

March 2-4 — SOUTHERN SAFETY CONFERENCE & EXPOSITION—
Peabody Hotel, Memphis, Tenn. Contact: W. L. Groth, P.O. Box 8927, Richmond 25, Va.

March 17-19 — WESTERN SAFETY CONGRESS & EXHIBITS —
9th Annual Meeting, Ambassador Hotel, Los Angeles, Calif. Contact: Joseph M. Kaplan, 3388 W. 8th Street, Los Angeles 5, Calif.

March 23-29—AMERICAN CONGRESS ON SURVEYING & MAPPING—AMERICAN SOCIETY OF PHOTOGRAMMETRY—
Consecutive Meetings & Exhibit, Shoreham Hotel, Washington, D.C. Contact: ACSM-ASP, 1515 Massachusetts Ave. N.W., Washington 5, D.C.

May 18-22—AMERICAN SOCIETY OF PLANNING OFFICIALS—
Annual Conference, Hotel Statler, Washington, D.C. Contact: Dennis O'Harrow, ASPO, 1313 E. 60th St., Chicago 37, Ill.

August 17-22 — ILLUMINATING ENGINEERING SOCIETY—
National Technical Conference, Toronto, Ont. Contact: IES, 1860 Broadway, N. Y. 23, N.Y.

September 14-19 — AMERICAN ASSOCIATION OF MOTOR VEHICLE ADMINISTRATORS —
Annual Meeting, Fairmount Hotel, San Francisco, Calif. Contact: AAMVA, 912 Barr Bldg., Washington 6, D.C.

September 16-20 — FOURTH INTERNATIONAL STUDY WEEK IN TRAFFIC ENGINEERING—
Copenhagen, Denmark. Contact: World Touring and Automobile Organization, 32 Chesham Place, London, SW1, England.

September 28 - October 1 — AMERICAN PUBLIC WORKS ASSOCIATION—
Muehlebach Hotel, Kansas City, Mo. Contact: APWA, 1313 E. 60th St., Chicago, Ill.

October 12-17 — AMERICAN TRANSIT ASSOCIATION—
Roosevelt Hotel, New Orleans, La. Contact: ATA, 292 Madison Ave., N.Y.C.

October 13-17 — AMERICAN SOCIETY OF CIVIL ENGINEERS—
National Convention, New York City. Contact: ASCE, 29 W. 39th St., N.Y.C.

October 20-23 — INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION—
Sheraton Hotel, Philadelphia, Pa. Contact: IMSA, 130 W. 42nd St., N.Y.C.

October 20-24—NATIONAL SAFETY CONGRESS
Conrad Hilton, Congress and other hotels, Chicago, Ill. Contact: NSC, 425 N. Michigan Ave., Chicago 11, Ill.

November 10-14 — INSTITUTE OF TRAFFIC ENGINEERS—
28th Annual Meeting, Deauville Hotel, Miami Beach, Florida. Contact: ITE, 2029 K St.,NW, Washington 6, D.C.

November 28-December 5—AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
Annual Meeting, Sheraton-Palace Hotel, San Francisco, Calif. Contact: AASHO, National Press Bldg., Washington 4, D.C.

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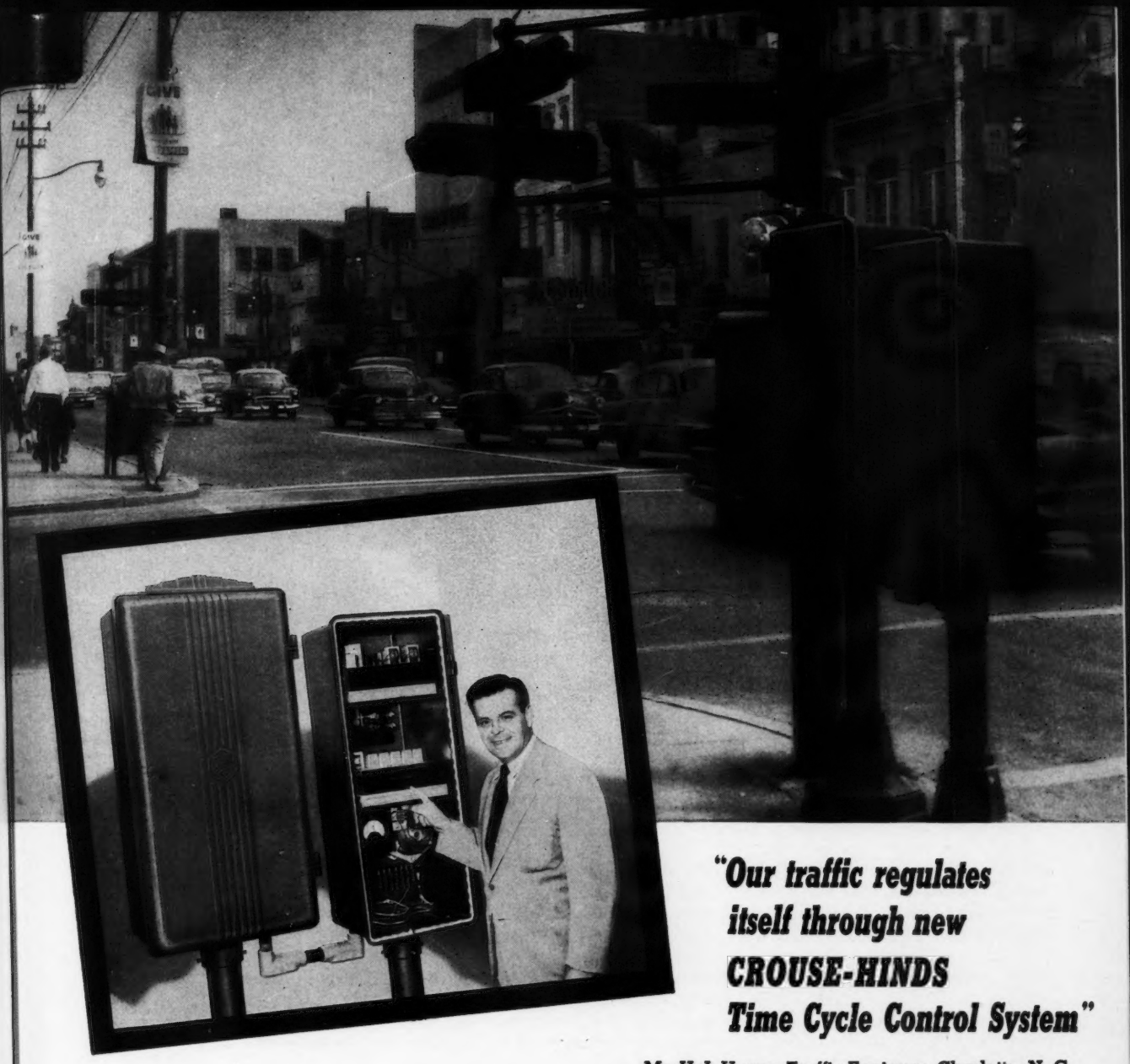

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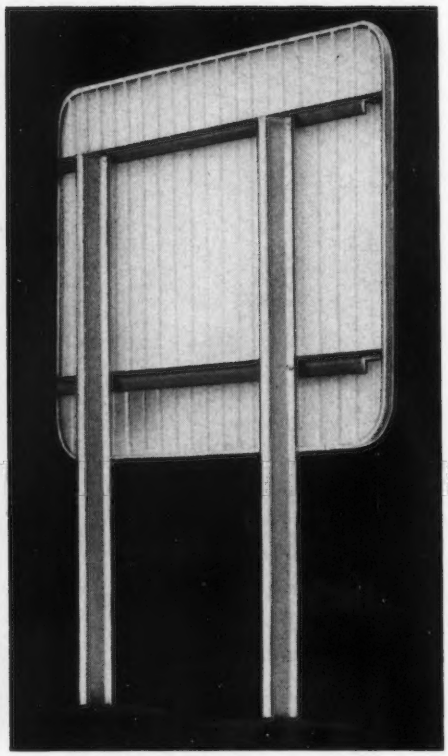

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Outdoor Advertising Association of America, Inc.
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Reference Notes

EXPERIENCE WITH RIGHT-TURN-ON-RED

By James C. Ray
(Jun. Mem., ITE)
Traffic Engineer, Santa Ana, California

The traffic section, Department of Public Works, with the cooperation of the Police Department records division, has conducted a survey of accidents involving right-turning vehicles at signalized intersections in Santa Ana, California. The study was conducted to provide additional data to supplement a paper published in the 1956 Proceedings of the Institute of Traffic Engineers.

The State of California Vehicle Code permits right-turn-on-red at all signalized intersections unless specifically prohibited by local ordinance. The City of Santa Ana has 36 signalized intersections which were in place during the period January 1, 1955 to May 1, 1957, when the study was conducted. At 13 of these intersections right-turn-on-red was prohibited.

The table below summarizes the 2 years and 4 months of accident experience.

The summary of accidents where right-turn-on-red is permitted shows no accidents involving a right-turn-on-red vehicle and 10 accidents involving right-turn-on-green vehicles. There were 4 pedestrians injured and one killed in accidents involving right-turn vehicles. All these vehicles were making right-turn-on-green.

Traffic volume counts were made at 4 locations in Santa Ana. All locations permitted right-turn-on-red. The counts were made during mid-afternoon hours. A total of 183 vehicles made right-turn-on-red out of 1,490 vehicles turning right during 8 hours of count (approximately 12 per cent).

This study indicates that right-turn-on-red as practiced within the City of Santa Ana does not add any hazard at signalized intersections. This conclusion is based on the fact that there have been no accidents in two years and four months involving a right-turn-on-red vehicle.

The author firmly believes that the right-turn-on-red is a definite benefit to traffic movement and does not add any significant hazard to pedestrian or vehicular traffic. At the present time an ordinance is being studied which will abandon the no-right-turn-on-red at the 13 intersections. If this is passed, it will provide valuable comparative information.

	Total Accidents	*Accidents involving right turn vehicles*		*Accidents involving right turn vehicles and pedestrians*	
		On Green	*On Red*	*On Green*	*On Red*
Accidents where right-turn-on-red was permitted:					
All types	211	10	0	4	0
Injury	38	5	0	4	0
Fatal	1	1	0	1	0
Accidents where right-turn-on-red was prohibited:					
All types	149	4	—	1	—
Injury	27	1	—	1	—
Fatal	0	0	—	0	—

ON-RAMPS CHARACTERISTICS

(Continued from page 12)

ume fed by the three lanes of the thru route before the merging area.

Based on the findings of the study, there appears to be no evidence in favor of a compounded merging area at a high volume on-ramp location. The merging area accommodated the same volume whether operated as an elemental or a compounded merging area. Therefore, it did not appear advantageous to have more than four lanes feeding it when only three were leading away from it. With specific reference to the high volume ramp, from the data here it appears wise to consider either adding a lane to the thru route after the ramp or removing one before the ramp if full utilization of a two-lane ramp is to be attained.

TRAFFIC NEWS

(Continued from page 25)

The routes chosen for designation under the original 40,000 mile authorization include five new city-to-city highways totaling 886 miles and 216 miles in or near urban areas. The city-to-city routes including some mileage in intermediate states are:

Canton, Ohio to Charlotte, N. C., 431 miles.

Pittsburgh to Erie, Pa., 102 miles.

Ogden to Echo Junction, Utah, 40 miles.

Nashville, Tenn., to Cairo, Ill., 170 miles.

San Antonio to Corpus Christi, Texas, 143 miles.

In addition, the 216 miles include: urban connections in Chicago, Philadelphia, St. Louis, Washington, D. C., Kansas City, Louisville, Omaha and Duluth, as well as the earmarking of mileage to provide circumferential or belt routes for cities of more than 200,000 population where routes already designated fail to provide such facilities.

The cities involved are Cincinnati, O.; Louisville, Ky.; San Diego, Calif.; Akron, O.; Springfield-Holyoke, Mass.; Dayton, O.; Hartford, Conn.; Oklahoma City, Okla.; Syracuse, N. Y.; Jacksonville, Fla.; Scranton, Pa.; Salt Lake City, Utah; and Sacramento, Calif.

Secretary Weeks directed the Bureau of Public Roads to issue letters of approval for all routes in the group which have already been proposed by the state highway departments and to open discussions on the remaining routes to accomplish early designation through coordinated state and Federal action.

Northwest Traffic Engineering Conference Planned for January

The 11th Annual Northwest Traffic Engineering Conference has been scheduled for January 22 to 24 at Oregon State College, Corvallis.

Plans for the Conference are in the hands of a local committee, which reports that the sessions will be geared to working fundamentals. This is being done to make the Conference of value both to the younger man just starting in traffic and to the city and county officials who find that traffic problems are being added to their existing work.

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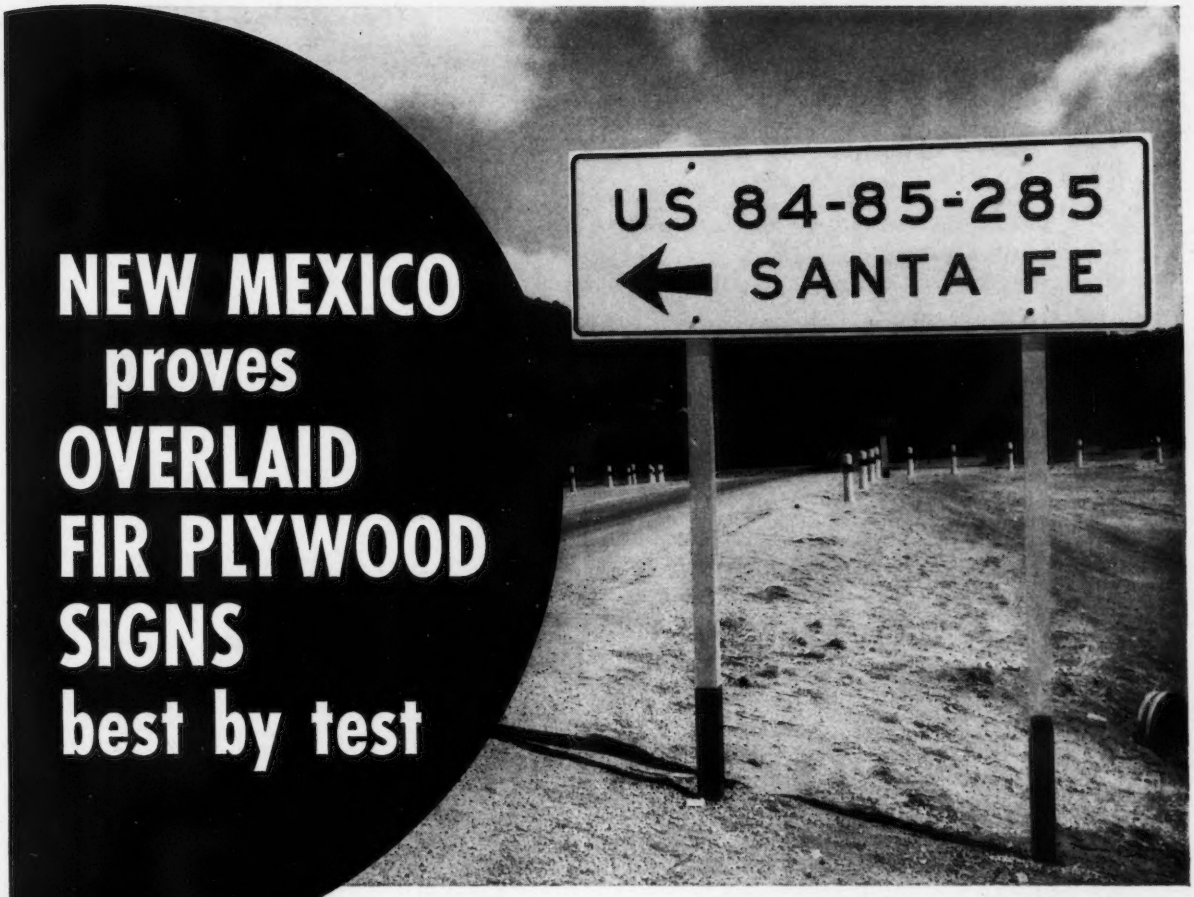

Plagued by vandals—who took an annual toll of over $25,000—and damage from severe weathering, the State of New Mexico Highway Department five years ago began a series of laboratory and field tests to develop signs which would effectively lower maintenance and replacement costs.

As a result, the department reports overlaid plywood the most durable of all sign materials. The state is now using it to replace steel and aluminum for signs in areas where vandalism had been prevalent. To date over 44,000 overlaid plywood signs have been placed in service. In all cases, they have lived up to expectations.

The Highway Department also cites superior paintability, ease of fabrication and elimination of framing or backing in larger signs as additional points in favor of overlaid plywood signs.

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PARKING METERS

The program will be operated on a "workshop" or "clinic" pattern, and will have a minimum of formal papers. Considerable attention will probably be given to signing practices, but other subjects will not be neglected.

Professor Martin P. Coopey of the Civil Engineering Department at Oregon State College is in charge of arrangements, and J. Al Head of the Highway Department is planning the program.

Training Opportunities

January 22-24 — NORTHWEST TRAFFIC ENGINEERING CONFERENCE—

The 11th annual conference, sponsored by Oregon State College and the Oregon State Highway Department. Held at Oregon State College, Corvallis. Contact: Martin P. Coopey, Professor of CE, OSC, Corvallis, Ore. for further information.

March 3-21—TRAFFIC ENGINEERING SEMINAR

Sponsored by Northwestern University Traffic Institute and the Midwest Section, ITE. For traffic engineers and others with engineering backgrounds. Tuition $165. For information, address: Northwestern University Traffic Institute, 1704 Judson Ave., Evanston, Ill.

March 17-21 — 3rd ANNUAL SHORT SCHOOL ON TRAFFIC ENGINEERING —

Sponsored by Texas Transportation Institute and CE Department of Texas A&M, Texas Section of ITE, and League of Texas Municipalities. For those concerned with traffic engineering functions of both cities and states. Attendance limited to 40. Contact: Charles J. Keese, Short School Director, % Dept. of Civil Engineering, A&M College of Texas, College Station, Texas.

CORRECTION

On page 27 of the November issue we inadvertently transposed two pictures — those of Paul F. Royster and Ernest R. Freeberg. Our apologies to both of these gentlemen.

Reference Notes

PULSATING RED IN TRAFFIC SIGNALS

By Col. W. O. Shrader
(Mem., ITE)
Traffic Engineer, Montgomery, Alabama

Many efforts have been made to increase the target value of the red in traffic signals. Shutters, a "double red," a 12-inch lens, and perhaps other devices have been used.

In Montgomery, the latest of these efforts has been to pulsate the light at approximately 180 times per minute. This off-on effect not only attracts attention to the light itself, but it also eliminates "sun phantom." The pulsating light leaves no doubt as to whether or not the light is burning.

Several methods have been employed to produce the pulsating effect. The first of these consisted of a motor driven cam which opened and closed contacts. Since this was a slow action, make-and-break, it had inherent contact-burning trouble along with motor mechanism failure.

Different types of relays have been tried. The basis of the operation of each of these was that the coil was closed through its own contacts. When energized, the relay opened the contacts, which in turn de-energized the coil. Thus the relay acted as a vibrator giving a pulsating effect to the signal. The inherent faults of this type of control were the burning of the contacts and the difficulty of controlling the rate of pulsation.

The latest in this field of control is a pulsating relay, manufactured by a local firm. It incorporates a variable multi-vibrator driving one or more mercury-wetted contact relays. This provides rate control of pulsation and eliminates the burning of contacts. The sturdiness of this mercury relay is attested to by the fact that the manufacturer rates its operation in the billions before failure is anticipated. A feature of this relay is that the signal circuit is completed through a resistance. If relay equipment failure should be encountered, the signal would remain lit at a slightly lower intensity. It does not cause radio interference.

The City of Montgomery, in its search for safety, is installing these relays at several of its most critical intersections. As installed, an extra "common" for the red lights is pulled from the controller to the signal. This circuit, being connected through the resistance of the relay, provides for a pulsating red light on all four sides. If it is not convenient to pull in this extra lead, the same effect could be had by using two mercury wetted contact relays instead of one.

As a further means toward safety, the new twelve-inch red lenses are being installed on the City's highway bypass. This incorporated with the above pulsating relay should give a red signal of maximum "target value" which should result in the maximum of safety.

Membership Applications

The following applications have been received since the list published in the November issue.

APPLICATIONS FOR TRANSFER

CONNER, Robert E.
Traffic Engineer, Tippetts-Abbett-McCarthy-Stratton, 62 West 47th Street, New York, New York. November 5, 1957 for ASSOCIATE grade.

MAYER, Howard C.
Outdoor Lighting Specialist. General Electric Company, 570 Lexington Avenue, New York 22, New York. October 10, 1957 for ASSOCIATE grade.

RIGOTTI, Robert A.
Traffic Sign Engineer, Michigan State Highway Department, Stevens T. Mason Building, Lansing, Michigan. October 10, 1957 for MEMBER grade.

ROBINSON, Carlton C.
Traffic Engineer, Automotive Safety Foundation, 200 Ring Building, Washington 6, D. C. October 11, 1957 for MEMBER grade.

NEW APPLICATIONS

BAKER, Samuel T., Jr.
Assistant Traffic Engineer, Bureau of Traffic Engineering, 900 East Broad Street, Richmond 19, Virginia. October 28, 1957 for ASSOCIATE grade.

CARLSSON, Bernard L.
Assistant Engineer, City Engineer's Department, City Hall, Johannesburg, South Africa. October 9, 1957 for ASSOCIATE grade.

COOPER, George J.
Associate Highway Electrical Engineer, California Division of Highways, 150 Oak Street, San Francisco, California. October 7, 1957 for ASSOCIATE grade.

FREEMAN, Robert L.
Assistant District Traffic & Planning Engineer, Florida State Road Department, Traffic & Planning Division, District 1, Bartow, Florida. October 9, 1957 for JUNIOR grade.

PETERSEN, Stephen G.
Senior Traffic Engineer, N. J. Bureau of Traffic Safety, 32 East Hanover Street, Trenton, New Jersey. October 14, 1957 for JUNIOR grade.

PRIETO-URDAZ, Alberto
Civil Engineer, Department of Public Works, Traffic Bureau, San Juan, Puerto Rico. October 25, 1957 for JUNIOR grade.

SUNDARAM, Mahadevan
Traffic Engineer, Office of the Deputy Inspector General of Police, West Bengal State, No. 2, Loudon Street, Calcutta 16, India. October 10, 1957 for MEMBER grade.

YOUNG, William T.
Assistant Traffic & Planning Engineer, S. C. State Highway Department, Columbia, South Carolina. October 10, 1957 for ASSOCIATE grade.

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Evanston — Illinois

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Tallahassee — Florida

ELECTRONIC SCALES

(Continued from page 19)

by the time his 10 scales are in operation in 1958 a digital type readout will have been developed to speed up the data processing. Now the conversion of the weight traces into coded punched cards for computer analysis is a rather tedious task.

Maintenance of the electronic scale appears not to present any serious problems. The load cells under the Tama platform have been installed for three years, subjected during that time to the constant pounding of westbound vehicles, three winter periods, and three summer hot spells. No special care of the pit was taken during this long period. No special pumping was done after heavy rainfalls, nor have the cells been removed for inspection or servicing. To date the load cells still "balance" properly and provide accurate readings. The new scale foundations will incorporate one important improvement, i.e. the addition of an adjustable strut to simplify the platform leveling operation.

When the Interstate Highway System begins to shape up in Iowa sixteen additional electronic scale research platforms will be needed. These will be installed during the paving construction. All told then, Iowa will boast 26 electronic motion weighing scales, a complete coverage of all important truck route segments, and a means of keeping current on just what axle weights, weight frequencies, speeds, and axle spacings are imposed on Iowa's highway pavements.

MOTOR VEHICLE DEATHS AND DEATH RATES

1955, 1956, and 1957

Month	1955	1956	1957	1955-57 Change	1956-57 Change
January	2,810	2,990	2,900	+ 3%	−3%
February	2,319	2,720	2,530	+ 9%	−7%
March	2,602	2,920	2,860	+10%	−2%
April	2,753	2,930	2,930	+ 6%	0%
May	3,101	3,170	3,110	0%	−2%
June	2,982	3,290	3,290	+10%	0%
July	3,350	3,570	3,320	− 1%	−7%
August	3,586	3,610	3,790	+ 6%	+5%
September	3,446	3,710	3,380	− 2%	+9%
Nine Months	26,949	28,910	28,110	+ 4%	−3%
October	3,918	3,460			
November	3,559	3,690			
December	4,000	3,940			
Total	38,426	40,000			

All 1955 figures are from the National Office of Vital Statistics.
All others are National Safety Council estimates.

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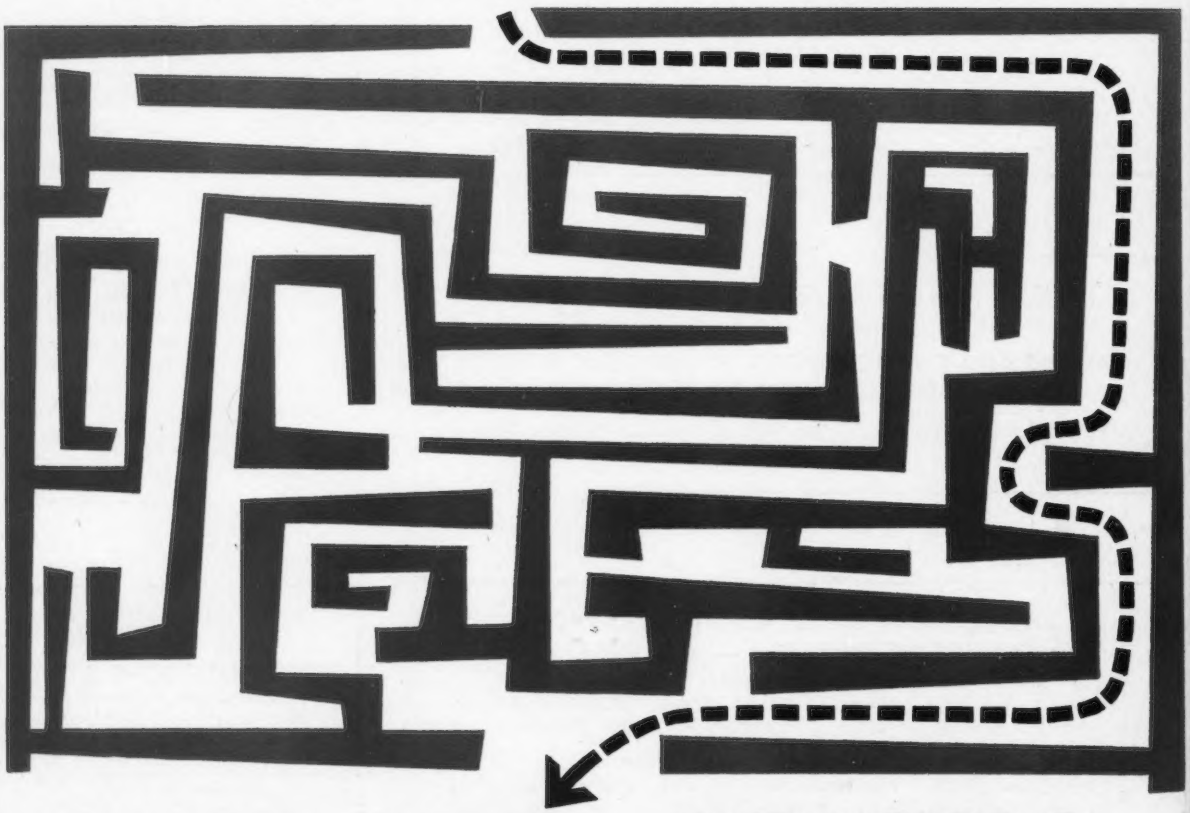

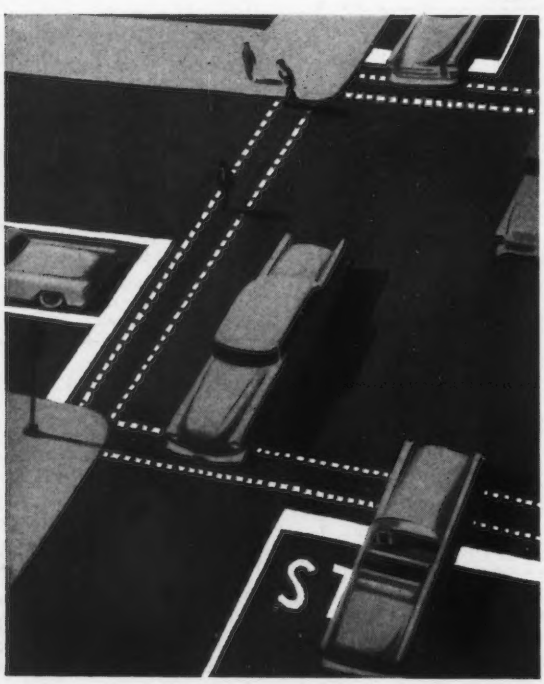

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